DISTRICT-WISE PATTERN OF DEVELOPMENT

IN

UTTAR PRADESH

(A Study Financed by the ICSSR, New Delhi)

R. T. TEWARI

GIRI INSTITUTE OF DEVELOPMENT STUDIES
B-42, NIRALA NAGAR, LUCKNOW 226007

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PREFACE

The present work endeavours to analyse the changes in the district-wise pattern of development in Uttar Pradesh during 1980-81 over the base year 1970-71. The whole work can broadly be divided into three parts. The first part provides the analytical frame including choice of indicators and the methodology for working out composite indices of development. The major findings regarding the patterns of overall and sectoral development of different districts are incorporated in the second part, whereas the third part is devoted to deriving certain significant conclusions and policy implications. Analysis of patterns of development of different districts based on the single indicator of per capita income is deemed to be incongruous not only because of serious methodological problems in estimating income at the district level but also due to the questionable relevance and rationale of such aggregative concept for policy purposes. The development is therefore, represented by the total vector of 31 indicators drawn from the key sectors of agriculture, industry, economic infrastructure and social services. The principal component analysis has been used in working out a system of weights for indicators representing different dimensions, to construct composite indices of development. Besides, all the 56 districts of the state have been divided into high, medium high, medium low and low categories in terms of composite index slabs in descending hierarchy, referring to the base year, i.e. 1970-71. The districts falling in the category of high level of development are designated as 'developed' and those constituting medium high, medium low and low categories are classed as less developed districts (LDDs), all of which require special treatment in the comprehensive regional planning at the micro-level.

The analysis of spatial patterns of development exhibits upward movements of a considerable number of districts in levels of development and a significant reduction in the inter-district disparities during seventies which seem to have finally accomplished some definite improvements in the patterns of overall development of different districts probably due to adoption of the revised strategy of development tuned towards bottom-up approach. Further more, analysis of sectoral patterns of development reveals that the contribution of primary sector to overall economy in terms of both income and employment has shown deceleration in most of the districts during seventies, whereas the corresponding contribution of secondary sector has simultaneously increased in majority of the districts. But the rates of both deceleration and acceleration are found to be relatively higher in the developed districts. The achievements in terms of better diversified structure of economy, higher productivity, efficient economic infrastructure and increased income and

employment are quite perceptible in developed districts. Whereas less developed districts still suffer from severe sectoral deficiencies, causing underdevelopment characterised by low income, low productivity, low employment, deficient economic infrastructure, etc. Viewing this, the role of secondary sector and economic infrastructure as identified in this study appears to be the most crucial in bringing about significant improvements in the patterns of development of less developed districts. But the issue intriguing the less developed districts is not simply of selectivity but rather one of ensuring the balanced sectoral expansion of the economy. Therefore, visualising the need of the multi-pronged approach certain policy prescriptions regarding the development of agriculture, industry, economic infrastructure and social services have been suggested with a view to reducing sectoral deficiencies of less developed districts and achieving the objective of balanced regional development.

The author is grateful to the Indian Council of Social Science Research, New Delhi for providing financial assistance to undertake this study. I wish to record my sincere thanks to the Director, Area Planning Division and the Director, Economics And Statistics Division of the State Planning Institute, Lucknow for extending their cooperation in making the requisite data available for the study. I am grateful to the Director, Computer Centre, University of Delhi for rendering the services of IBM 360/44 Third Generation System for mechanical processing of data. I express my deep sense of gratitude to Dr.T.S. Papola who has often taken trouble to help me in the development of new ideas. I am sincerely thankful to Sri R.C. Sinha for his suggestions in making better use of statistical tools. I am also grateful to supporting research staff, O.P. Pandey and N.C. Joshi for their involvement in the task, to S.K. Ghosh for mechanical processing of data on some aspects and to P.J. Devassy Kutty and Subhashis Mukherjee for their nice handling of the manuscript.

R.T. TEWARI

CONTENTS

Chapter I

INTRODUCTION

1. A Historical Perspective

India initiated the process of planned development more than three decadesago with the First Five Year Plan in April 1951. The main purpose of planning was identified as that of starting the process of development which will raise living standards and open out to the new opportunities for a richer and more varied life.[1] The manner in which this purpose was translated into specific objectives went on changing from plan to plan. However, in a broader sense the aim of our economic planning in India has been to bring about a structural transformation of the economy so as to achieve a high and sustained rate of growth, a progressive improvement in the standard of living of the masses leading to the eradication of poverty and unemployment and provide the material base for a self-reliant socialist economy.[2] Our development planning in its early phases was primarily concerned with attaining higher level of economic development. The scarcity of resources and the productivity of investment often made it imperative for the decision makers to concentrate developmental efforts at those points of the economy and those regions of the country where

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1 Government of India : First Five Year Plan, Planning Commission, New Delhi.

2 Government of India : Sixth Five Year Plan - 1980-85, Planning Commission, New Delhi, p.17.

returns were likely to be the greatest. As a result of this, no doubt there was some progress in the economy in aggregative terms at the national as well as state levels. But the effects of such investment were finally mopped up and impounded by the urban and rural conglomerates. The planning failed even in initiating a trend towards achieving a balanced regional development. Not only were the vertical disparities accentuated during the first decade of planning, the horizontal balance, too showed distinct signs of deterioration. The lopsided development was, inter alia, operationalised through a substantial public sector investment at already developed centres (urban agglomerations) and high incentive rural pockets.

Therefore, in the Third Five Year Plan balanced regional development was expressed as a specific objective and emphasis was laid on the development of less developed areas and the improvement in the living conditions of weaker sections of the community. The approach was to secure the maximum possible exploitation of the existing resources of each State for higher contribution to the national pool. The Fourth Plan took cognisance of the natural tendency of gravitating new enterprises and investment towards already developed and overcrowded metropolitan areas. A higher allocation of central assistance to backward areas and promotion of industries were, therefore, considered to be the effective instruments for securing balanced regional development. There was a gradual shift in strategy of development from 'top down' to 'bottom up' and industrialisation of backward areas and district planning were taken up on priority

basis, besides launching various programmes based on 'Area Development' and 'Target Group' approaches. A new dimension of 'social justice' was added to our basic objective of 'economic development' during the Fifth Plan. The accelerated development of backward areas was conceived as a cooperative endeavour in which Central and State Governments had to play the pivotal role. A heavy reliance was placed on 'Area Development' and 'Target Group' approaches for enhancing the benefits of backward areas and exploited sections of the society. The various programmes based on these approaches, which were launched around seventy, comprise industrialisation of backward areas, Command Area Development (CAD), Drought Prone Area Programme (DPAP), Tribal Area Development (TAD), Small Farmers Development Agency (SFDA), Marginal Farmers and Agricultural Labourers (MFAL), District/Block Plans, etc. The Sixth Plan conceived of progressive reduction in regional inequalities in the pace of development and in the diffusion of technological benefits, besides laying emphasis on rural development.

Hence we find that all-out efforts were made during the previous three decades of planning in India to augment the level of development and improve upon the structure of economy and also to achieve the objective of balanced regional development. With the result, the composition of national income has changed steadily over the planning period and share of mining, manufacturing, construction and productive infrastructure has increased to about 30 per cent in 1978-79. Moreover, the structure of the Indian economy, the technology of production

in agriculture and industry and the institutional framework within which economic activities are conducted have also changed substantially. Besides, an improvement in the quality of life is also witnessed by 46 per cent increase in per capita private consumption.[3] In spite of these appreciable changes it is generally argued that regional disparities have accentuated to a considerable extent during this period.

The state of Uttar Pradesh, which comprises five economic regions (Western, Central, Eastern, Hills and Bundelkhand) and fifty six districts (shown in Map-1) is not exception to the above situation. The structure of economy in this state also has undergone certain changes. The contributions of secondary and tertiary sectors to the total State income at constant prices of 1970-71 have increased respectively from 14.9 and 24.9 in 1970-71 to 17.30 and 25.00 during 1980-81.[4] Moreover, the proportion of non-agricultural workers to total workers has also increased from 23.09 per cent to 25.29 per cent during this period.[5] Besides, there has been a considerable increase in infrastructure too. The length of pucca roads per lakh of population increased from 30 kms. in 1970-71 to 50 kms. during 1980-81, whereas percentage of villages electrified to total villages increased from 18.41 to 34.31 during this period.

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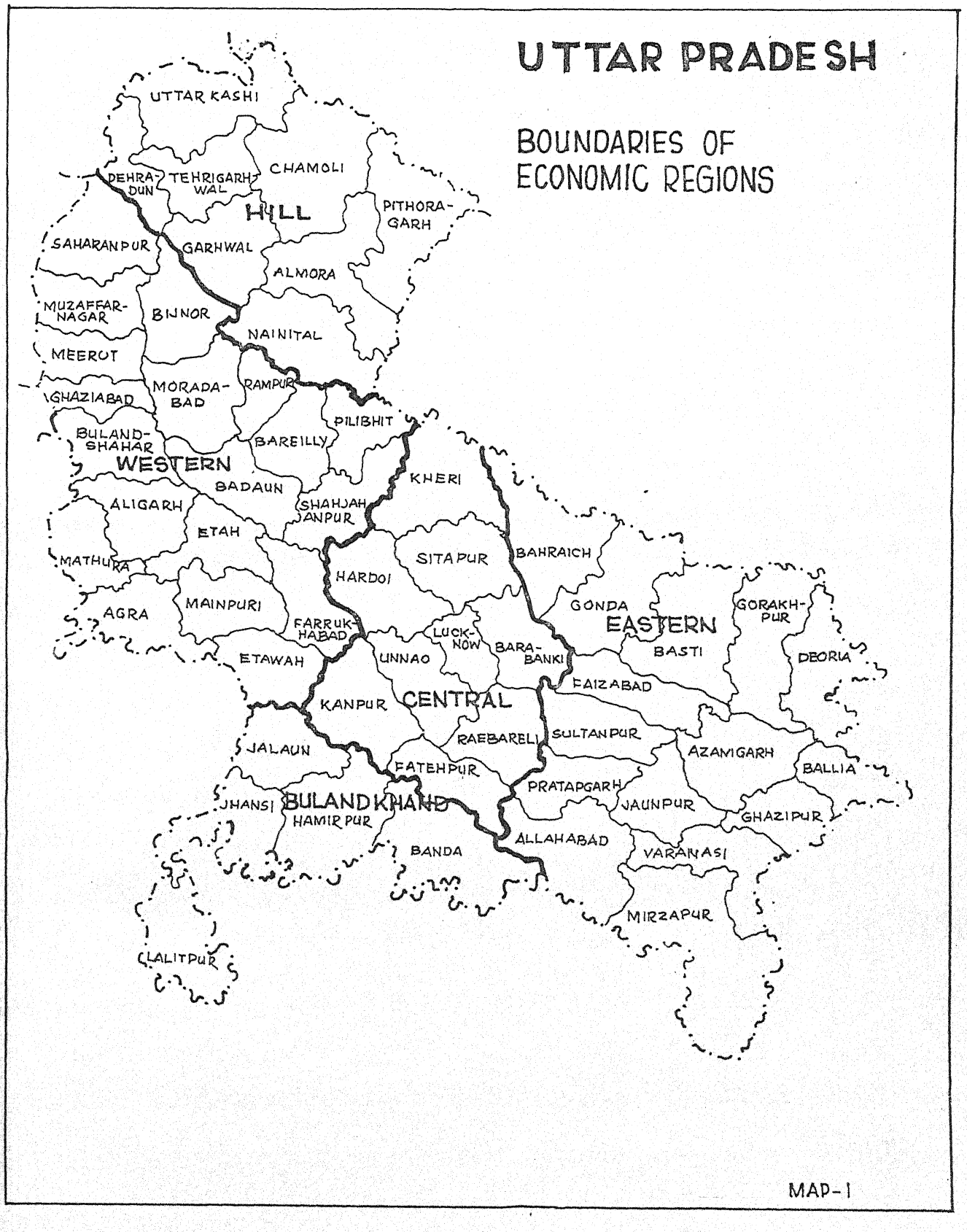
3 Ibid., p.3.

4 Government of Uttar Pradesh : Draft Annual Plan : 1983-84, Vol.1, p.13, Planning Department, Lucknow.

5 Census of India - 1981, Series - 22, Uttar Pradesh, Paper 1, Supplement, Provisional Population Totals, Director of Census Operations, Lucknow, p.112.


UTTAR PRADESH
BOUNDARIES OF
ECONOMIC REGIONS
UTTAR KASHI
CHAMOLI
DEHRA-DUN
TEHRIGARH-WAL
HILL
PITHORA-GARH
SAHARANPUR
GARHWAL
ALMORA
MUZAFFAR-NAGAR
BIJNOR
NAINITAL
MEEROT
MORADA-BAD
RAMPUR
GHAZIABAD
PILIBHIT
BULAND-SHAHAR
BAREILLY
WESTERN
KHERI
BADAUN
ALIGARH
SHAHJAHANPUR
ETAH
SITAPUR
BAHRAICH
MATHURA
HARDOI
GONDA
EASTERN
GORAKH-PUR
AGRA
MAINPURI
FARRUK-HABAD
LUCK-NOW
BARA-BANKI
BASTI
DEORIA
ETAWAH
UNNAO
FAIZABAD
KANPUR
CENTRAL
RAEBARELI
SULTANPUR
JALAUN
AZAMIGARH
BALLIA
FATEHPUR
PRATAPGARH
JHANSI
BULANDKHAND
JAUNPUR
GHAZIPUR
HAMIRPUR
ALLAHABAD
BANDA
VARANASI
MIRZAPUR
LALITPUR
MAP-1

The above structural changes at the state level point out to the fact that there might have been some improvements in levels as well as patterns of development in different districts. Second, so far there has been an application of uniform strategy for development of different districts. Efforts have never been made to formulate regional/district level strategies within the broad framework of national/state level objectives taking into account the existing level and pattern of development. Attempts to formulate differential development strategies can be made only after assessing and analysing the level as well as pattern of development. Third, quite a large number of programmes based on 'Area Development' and 'Target Group' approaches were started around seventy with a view to accelerating the pace of development in backward areas and providing maximum possible benefits to the exploited section of the society. It would, therefore, be relevant to analyse as to what extent the implementation of these programmes has proved to be effective in reducing regional disparities in levels of development and bringing about improvements in district-wise pattern of development.

Lastly, at the national level, there has been much emphasis on accelerating the pace of development in backward areas and for this purpose Government of India have already started various programmes in different parts of the country. The study of this kind would largely help in identifying the districts suffering from overall backwardness and also those backward in relation to key sectors of the economy like agriculture and industry. This,

in turn, would further help in making choice of operational areas for different kinds of programmes likely to be launched in order to overcome the problems of backwardness. In view of these considerations, it was felt imperative to study and analyse the district-wise pattern of development at two points of time (i.e., 1970-71 and 1980-81) not only for the overall economy but also for the key sectors of agriculture, industry, economic infrastructure and social services.

Operationally, our present study would differ from the previous ones conducted particularly in the context of Uttar Pradesh. No such studies for Uttar Pradesh following the methodology of principal component analysis have been carried out so far. The studies of Ashok Mitra,[6] Galina Sdyasuk[7] and A.K. Singh[8] are mainly concerned with economic regionalisation. The study of 'Inter-District Disparities in U.P.' carried out previously in the State Planning Institute, Lucknow is descriptive in nature and generally highlights the inter-regional/district disparities with the help of the cross-section data of selected indicators without making use of any statistical technique.[9] Another study carried out by the same Institute

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6 Mitra, A., Levels of Regional Development in India, Census of India, Vol.1, Part I-A, 1961.

7 Galina Sdyasuk, Urbanisation and the Spatial Structure of Indian Economy - 1971, in B.K. Roy Burman (ed.), Economic and Social Cultural Dimension in Regionalisation in India, Monograph No.7, Census of India, 1971.

8 A.K. Singh, Demarcation of Planning Regions, in R.P. Misra (ed.), Regional Planning Concept, Techniques, Policies and Case Studies, University of Mysore, 1969.

9 Tewari, R.T., Inter-District Disparities in U.P., 1977, State Planning Institute, Lucknow.

in the context of Uttar Pradesh relates to mainly economic regionalisation based on the principle of Euclidean Cluster Analysis.[10] It provides cluster-wise hierarchical pattern of development for a group of districts at one point of time but it does not give hierarchical order of development for individual districts falling in each of the clusters. Lastly, the study of impact of Green Revolution on the regional development of Agriculture in U.P., does not attempt to analyse the district-wise pattern of development but lays emphasis mainly on regional pattern of agricultural development.[11]

2. Objectives

The main objective of the present study is, therefore, to analyse the district-wise pattern of development in U.P. at two points of time (i.e. 1970-71 and 1980-81), focussing on inter-district variations in levels of development. Within the frame of this broad objective, the specific objectives set out for the study are as follows :

i) To study and analyse the concept, classification and criteria of indicators and select suitable ones for assessing and analysing the district-wise level and pattern of development;

ii) To analyse, in brief, the various methods for construction of composite index of development and make choice of a suitable one for the purposes of present analysis;

iii) To measure the levels of development of different districts at two points of time (i.e. 1970-71 and 1980-81) in respect of overall economy and the key sectors of agriculture, industry, economic infrastructure and social services;

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10 Tewari, R.T., A Tentative Regional Framework for Balanced Development of Uttar Pradesh, May 1979, State Planning Institute, Lucknow.

11 Tyagi, B.N., Study of the Impact of Green Revolution on the Regional Development of Agriculture in U.P., Indian Journal of Agricultural Economics, Vol.XXIX, No.4, October-December 1974.

iv) To study and analyse the district-wise pattern of development at the selected two points of time for showing upward and downward movements of different districts in levels of development; and

v) To suggest measures which could help in improving the fate of less developed districts and achieving the objective of balanced regional development.

3. Hypotheses

The efforts have also been made in the study to examine the following hypotheses :

i) The objective indicators are expected to explain the district-wise level of development and help in assessing inter-district disparities;

ii) Whether changes in strategies of development around seventy have had a desired impact on reducing regional disparities;

iii) Whether more diversified structure of economy leads to a higher level of development; and

iv) Whether low level of development is related to low productivity, less use of modern technology, inadequacy of economic infrastructure and low degree of urbanisation.

4. Methodology

Development is a multi-dimensional phenomenon. Economists, Geographers, Sociologists and Regional Scientists define it in different ways with varying stress on its aspects. But generally they share with the view that it is an outcome of the progress made in different sectors of economic activities particularly primary, secondary and tertiary. Economic activities relating to primary sector reflect their association with rural living, whereas those of secondary and tertiary sectors exhibit characteristics of urban areas. The process of development involves both economic and structural changes

not only at macro-level but also concurrent changes in the economic activities over different regions including districts as micro-level units. Hence levels and patterns of development seem to have closer affinity with the space. If the primary objective is to confine its analysis to only one spatial administrative unit (say state, district or block), one can, first of all, carry out temporal analysis of the existing economic structure in terms of changes in output, employment, infrastructure, etc., and subsequently highlight the changes in the level and pattern of overall and sectoral development of that areal unit with the help of the salient features emerging from the analysis of its economic and structural changes. Hence pooling of selected indicators representing various socio-economic activities is not very much needed in case of single areal unit analysis.

However, in a situation like the present one where multi-areal unit analysis is under consideration, working out composite index of development is felt imperative for the purposes of convenient analysis. This is mainly because the development as described earlier is an outcome of several socio-economic activities, and unless indicators pertaining to those activities are combined together, it would probably be an insurmountable task to carry out a comparative analysis of levels and patterns of overall and sectoral development for different areal units and thereby have conclusive and meaningful results. Hence, the crucial stage in a multivariate analysis like the present one is that of contracting a large number of development indicators into the group indices.

The first and the most crucial task in an exercise of this kind pertains to the choice of indicators through which the process of development is articulated for the purposes of identification, classification, regionalisation and even for exploring causal relationships in explanatory models. In the present study, development is represented and is analysed by the total vector of 31 indicators, values of which differ from district to district throughout the State. These indicators are expected to portray the state of development that has taken place during the past in respect of different socio-economic activities relating to the sub-vectors of agriculture, industry, economic infrastructure and social services. A list of indicators falling in each of these sub-vectors is placed at Appendix I. The rationale for making choice of these indicators is incorporated in the second chapter of this study.

The next most crucial and familiar problem in construction of composite indices based on a large number of indicators is the method of pooling which has been receiving attention in diverse disciplines for at least the last two and half decades. The methods, which have been commonly used for construction of composite index of development by pooling several indicators are those of index, ranking and principal component analysis. A serious short-coming of first two methods is that while combining various physical variables either subjective

weights are assigned or they are left unweighted.[12] Since the variables vary in terms of their relative importance, assignment of equal weights fails to fetch accuracy in estimates. This lacuna is sought to be corrected by the third method, i.e. principal component analysis. The use of this method in India has been only in recent literature.[13] Since this method provides a better system of composite classificatory indices, the First Principal Component Analysis has been followed in the present case, details of its methodology are given in the third chapter of the report.

5. District as Unit of Analysis

District is taken as the most convenient and suitable unit of analysis here because of the three basic considerations. First, a fairly satisfactory data base has been built up at the district level during the recent past, besides availability of fully coordinated planning and development machinery and viable training and service facilities. Second, district offers better facilities for formulation and implementation of plans because of having a definite administrative set up and a distinctly demarcated geographical boundaries. Third, a coordination between macro-level and micro-level planning can be better

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12 M.J. Hagood, Statistical Methods for the Purpose of Delineation of Regions Applied to Data on Agriculture and Population, Social Force, Vol.21, 1943, pp.297-487.

13 M.N. Pal, Regional Disparities in the Level of Development in India, Indian Journal of Regional Science, Vol.VII, No.1, 1975.

established at the district level because of a wider scope of utilising local initiative of the people through their effective involvement in the process of development.

6. Reference Years

The study is carried out at two points of time, i.e. 1970-71 and 1980-81. The year 1970-71 is selected to analyse the district-wise pattern of development that emerged from adoption of sectoral planning and application of uniform strategy of development during fifties and sixties. Whereas the year 1980-81 is chosen to analyse the impact of implementation of various area specific programmes during seventies on the pattern of development of different districts.

7. Sources of Data

The study relies on the data compiled mainly from secondary sources. The major sources of data are : Census of India, 1971 and 1981, Government of India, Delhi; District-wise Indicators of Development in U.P., Economics and Statistics Division, State Planning Institute, U.P., Lucknow; Annual Survey of Industries, Economics and Statistics Division, State Planning Institute, U.P., Lucknow; and Bulletin of Agricultural Statistics, Directorate of Agriculture, U.P., Lucknow. Besides, some relevant data/information have also been obtained from the official records of Directorate of Industries, U.P., Lucknow, Directorate of Education, U.P., Lucknow, Directorate of Ground Water Resources, U.P., Lucknow and U.P. State Electricity Board.

8. Organisation of Study Report

The present study is organised in six chapters. The pluralistic planning efforts of previous three decades in India for overall and balanced regional development, need of the study, objectives, coverage and methodology employed are briefly indicated in the introductory chapter. The second chapter tries to provide a theoretical frame in terms of the concepts and classifications of indicators including criteria for their selection, and finally attempts to make a choice of indicators which could better explain and portray the state of development. Whereas the third chapter describes, in detail, the methodology of principal component analysis for working out composite index of development for different districts. With the help of composite indices, attempts have been made in the fourth chapter, to analyse the district-wise pattern of development for overall economy at selected two points of time by grouping the districts into high, medium high, medium low and low categories according to the similarities in levels of their development. The district-wise pattern of development pertaining to key sectors of agriculture, industry, economic infrastructure and social services and their relationships with the pattern of overall development have been analysed in the fifth chapter. The final chapter endeavours to derive certain significant conclusions and policy implications which could provide at least some guidelines for transformation of economy with a view to ameliorating the fate of less developed districts.

Chapter II

CONCEPT, CLASSIFICATION AND CHOICE OF INDICATORS

1. The Origin

The movement to evolve indicators on scientific lines for operationalising various concepts in the field of socio-economic research dates back to 1929 when a group of social scientists was invited by Herbert Hoover, the then President of United States to discuss the proposal of a national survey for analysing social trends.[1] During the period of early sixties this movement gained momentum. The researchers, government organisations and professional societies showed a greater enthusiasm and actively involved in construction of various kinds of indicators. In favour of this movement, they emphasised and argued that descriptive reporting generally fail to portray the relevant social situation in its proper perspective. They also claimed that indicators are of greater value in planning since they provide information regarding the current situation and future requirements of the society in relation to the national objectives. In view of its overwhelming importance, a large number of empirical studies were, therefore, completed during seventies, involving construction and application of socio-economic indicators.

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1 Kundu, A., Measurement of Urban Processes : A Study in Regionalisation, Bombay, 1980, p.29.

Moreover, we observe certain major shifts regarding the development of indicators during the period of previous two decades. First, there was a shift from using per capita income as a single indicator of development to multiple indicators. Earlier, it was customary to assess the level of development of different regions by using estimates of per capita income alone.[2] The regions enjoying higher per capita income were deemed to be more developed than the regions with low per capita income. Undoubtedly this method succeeded in focussing attention on the extent of poverty, but per capita income failed to reflect the differences in per capita real income and the standard of living. The serious shortcomings of this measure as pointed out by Myint however relate to inadequacy of converting state income statistics at national exchange rates, quantification of welfare associated with changing composition of output and distribution of income, varying degrees of monetisation in different states and the differences in the concepts used for computation of national or regional income.[3] In view of these demerits, a system of multiple indicators has frequently been used for analysing development during seventies.

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2 Hanna, F.A., State Income Differentials 1919-54, Duke University Press. Also Perloff, M.S., et al., Region, Resources and Economic Growth, Hopkins Press, 1960 and Williamson, J.G., Regional Inequalities and the Process of National Growth, Economic Development and Cultural Change, Vol.13, No.4, Part II, July 1965, pp.1-84.

3 Myint, H., The Economics of Developing Countries, Mutchinson University Press, 1969, Chapter 1, p.1.

Second, the use of indicators in economic growth models tended to be rather one sided affair with the social indicators playing a subordinate role. Therefore, the conference on statistical policy in developing countries held in May 1975 at the Institute of Development Studies, Sussex emphasised that new changes in economic models and the pressure for ensuring an equitable distribution of income are creating more and more demand for a wider range of economic as well as social indicators. An integrated system of these indicators was deemed to enable better use of open ended analysis of patterns of socio-economic development.

Third, there was a shift from using indicators measuring international differences to the use of indicators for assessing the socio-economic and spatial differences within the country. This shift primarily aimed at to look into the pattern of distribution and dependency and those of inequality, poverty and unemployment rather than universalistic prescriptions.

Fourth, there was also a shift in the operationalisation of indicators. In recent years, numerous systems of indicators have been proposed, besides social indicators. These systems can broadly be divided into two categories i.e. historical and intervention.[4] The historical system implies an analysis of the causal relations within the system and between the systems, whereas intervention system implies a relationship between causes

4 The Use of Socio-Economic Indicators in Development Planning, The Unesco Press, Paris, 1976, p.11.

and effects and a complex of values and objectives. The former calls for set of indicators contributing to our knowledge regarding the environment or pattern of socio-economic development surrounding the policy situation, whereas the latter calls for indicators relating to specific programmes measuring resources, activities, output and input or objective achievements. But any good system of indicators is supposed to include indicators relating to both aspects.[5]

In India too, during the previous decade a variety of socio-economic indicators were used in development planning for assessment of progress, identification of backward areas and measurement of regional disparities. However, no guidelines have yet emerged in regard to the concept, scope and classification to be developed to meet the needs of planning, policy formulation, evaluation of progress, etc. In order, therefore, to bridge this gap, attempts have been made in the subsequent sections to elaborate these aspects. 8394

2. The Concept

The term indicator has quite often been used in statistical references, but has never been defined in a precise manner. Even the standard dictionaries define indicator as one which shows, indicates or points out. But the term has, as a matter of fact, a wider connotation than its dictionary meaning. The term indicator is generally conceived as synonymous with variable

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5 Land, K., Theories, Models and Indicators of Social Change, International Social Science Journal, Vol.XXVII, No.1, 1975.

as well as index number. However, the minute observation helps to bring out a sharp distinction between them. The statistical handbooks generally provide raw data regarding the variables which may or may not indicate the relevant phenomenon. An indicator viewed as a combination of matters of facts (data) and matters of relation (theory) can be constructed only through a correct sequence between factual and logical order.[6] It is, therefore, through an appropriate transformation of the variables (which eliminates the effects of non-essential factors) within a theoretical format that an indicator can be obtained.[7]

On the other hand, the term indicator also differs from the index number which is defined as a quantity that shows by its variations the changes over time or space of magnitude which is not susceptible of direct measurement in itself or direct observation in practice.[8] While the index number generally conforms to a set form (or to certain alternative forms), the indicator has apparently no such formulation, although it too often measures indirectly the magnitudes which are not susceptible of direct measurement and usually reflects more than what it represents.[9]

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6 Daniel Bell, The Coming of Post Industrial Society, New Delhi, 1974, p.9.

7 Kundu, A., 1980, op. cit., p.30.

8 Kendall, M.G. and W.R. Buckland, A Dictionary of Statistical Terms, prepared for the International Statistical Institute, Edinbourgh, Oliver & Boyd.

9 The Use of Socio-Economic Indicators in Development Planning, op. cit., p.90.

The term indicator can better be understood by observing the relationship between basic statistics and derived series. The basic statistics is described as primary data available in Censuses, Sample Surveys and administrative records, whereas the derived series are those calculated from the primary statistics and are usually in the form of averages, percentages, ratios, etc. The indicators are generally derived series designed to portray the state, and trends in social conditions which are, or likely to become, the subject of public action or concern. They have to focus on main facets of the well-being of the population, effectiveness and efficiency of the social services and the distribution of well-being and the use of and benefits from the social services over the population.[10]

Thus, the indicators should essentially be of current significance, indicate current trends and be useable for current analysis, measurement of progress and determination of policies. Daniel Bell has rightly tried to conceive the indicators as statistics that articulate the occurrence of a given phenomenon. They are derived from the analytical frame in which the term denoting the phenomenon has meaning and relevance.[11] Einstein's statement in this regard is that indicators must be sought not through the abstract logic of mathematics but the underlying theory, essentially conceptualising the social and economic reality.[12] This can further be elaborated by the following example.

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10 Op. cit., p.91.

11 Daniel Bell, op. cit., p.12.

12 Heisenberg, W., Physics and Beyond : Encounters and Conversations, New York, 1971, p.63.

Take the case of number of veterinary hospitals in two districts which do not reveal much regarding the comparative levels of veterinary facilities unless their empirical reality is analysed by taking into account the denominators of livestock population, area and number of villages. First, in a situation in which veterinary hospitals are working to its full capacity or the total demand for veterinary facilities is not fully served owing to capacity constraints, an increase in livestock population is likely to reduce the availability of veterinary facilities per thousand of livestock population. Second, in case the accessibility to veterinary hospitals is the major constraint due to distance factor, the ratio of number of veterinary hospitals to area would be better alternative, provided veterinary hospitals are located in space in accordance with concentration of livestock population. Finally, in case, size of villages in a district does not show significant variations, the third denominator (number of villages) would be appropriate and more meaningful.

3. Criteria for Selection

Now-a-days majority of the developing nations provide high priority to reducing regional disparities and to measures designed to improve the level of living of the people below poverty line in both the forward and backward regions. The role of socio-economic indicators in the present context seems to be most crucial because they help in serving two basic purposes. First, they assist in crystalising the goals of development

planning in terms of specific objectives or targets and second they help in measuring the progress made towards the goals in relation to the targets fixed. Besides, they also serve a variety of other purposes like analysis of current situation of development, formulation of development policies and management of socio-economic services. The different purposes, which can possibly be served by making use of these indicators, comprise analysis of the main facets of well being of the population; portrayal of the state and trends in socio-economic conditions which are likely to become the subject of public concern; crystalisation of the goals of development planning in terms of specific objectives; assessment of the distribution of well-being; and their role as critical variables in building development models.[13] Thus, we find that socio-economic indicators can play a pivotal role in development planning primarily in two ways. First, they can help in analysing the pre-plan socio-economic conditions and secondly they can assist in monitoring progress towards development goals and providing information which facilitate in formulation of policy and programmes and selection of priority areas. In this way, they become an integral part of the planning process.

As to selection of indicators, we find that three basic criteria have generally been stressed in the recent literature. The first and foremost criterion is that indicators should reflect goals of development policy. In other words, they

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13 Moser, C., Social Indicators - Systems, Methods and Problems, Review of Income and Wealth, 1973, pp.133-43.

should be indicators of performance in terms of output, employment, etc. rather than those of resources alone. Second, they should occupy at least some place or position in an integrated system or model, whether explanatory or predictive. A third and more ambitious criterion is that indicators should closely be associated with theories of development. An inference, which can be drawn with the help of these criteria, is that selection of indicators should directly be concerned with their uses in the planning process.

However, the relevance of indicators seems to vary as between developed and less developed countries. Since the main objective of planning in the former is to maintain the tempo of attained level of development and ensure national distribution of benefits, indicators reflecting distribution or disparities would be more appropriate and meaningful. Whereas in case of the latter, since an ultimate goal of planning is to accelerate the pace of development alongwith ensuring equitable distribution of income, indicators relating to the performance of overall economy and those of key sectors and disparities should invariably be preferred. Availability of data is, however, a major limiting factor especially in case of less developed countries.

While determining the total vector of indicators for the use in development planning only those closely associated with the goals of development are required to be considered. These indicators should also be such that changes in their values over time reflect directly or indirectly the effects of development planning.

The scope of indicators should, therefore, be determined by taking into account the scope of development planning. An integrated system of indicators should include all types of socio-economic indicators pertaining to different sectors of the economy. However, in case, choice is invariably needed, the indicators should be development oriented and directly concerned with major goals of socio-economic development. Sometimes these goals might involve structural changes, in such circumstances indicators reflecting structural changes would be imperative. In case, goals involve changes in certain flows, flow indicators should be preferred. The progress made in social services should be measured in terms of the benefits derived by the population. However, in the absence of the data of benefits derived, the progress might be measured in terms of output indicators. Even if the data of output indicators are not available, input indicators would be better alternative.

Above all, a good indicator should have the following five properties :

i) It should be closely related to the situation and always be objective oriented;

ii) It should be unique and clearly understandable;

iii) It should be sensitive such that small changes in the areal unit could be reflected in the value of the indicator;

iv) As to feasibility, value of the indicator should easily be workable and information should not pose any problem; and

v) It should be stable such that comparable values can be obtained over time and space. In other words, the data elements used in its definition should not change their meaning over time, space and agency.

It has not been possible so far to evolve any scientific formula through which one can determine the appropriate size of indicators vector. It is, however, customary among the development planners to usually prefer a conservative list of indicators which could provide at least a correct skeleton of socio-economic development. It is generally remarked that too many indicators, which cannot be combined into a composite index of development, fail to provide even a summary view of development. On the other hand, too few indicators generally gloss over the important trends of socio-economic development. It would, therefore, be desirable to follow the principle of compromisation and represent the progress achieved by picking up at least one key indicator and three-four supplementary indicators against each of the policy goals/objectives. In the present case, since the main objective is to analyse changes in the district-wise pattern of overall and sectoral development during 1980-81 over the year 1970-71, preference has been given to only those indicators which could reflect development of agriculture, industry and socio-economic infrastructure and also help in analysing development situations.

4. Classification

As stated earlier, indicators have to serve certain basic purposes, which, in turn, also play a decisive role in making their broad classification. The classification of indicators is done in many ways. The descriptive indicators, which constitute one type of category, are generally being used for analysing the trends of overall and sectoral development, making

predictions and monitoring the progress. A second category of indicators relates to policy objectives or programme outputs. At the programme level, these indicators are being used for establishing horizontal linkages between resources, activities, beneficiaries and output or performance within the programme, and vertical linkages between the programmes.[14] The other indicators required for interpretation and explanation, constitute the third category called analytic indicators. This category is constituted by the indicators, which basically help in establishing causal relationships between dependent and independent variables. This kind of classification is essentially required for building interpretative or analytical models.

Another way of classifying indicators may be as follows : some are macro-indicators, whereas some others are micro-indicators. Some are designated as policy indicators while the rest are called performance indicators. Some are output indicators and some others are input indicators. Some are more direct indicators of current situation while some others are less direct or indirect indicators of services or facilities. Some are designated as flow indicators and some others are called stock indicators. Most of the indicators measure what exist while a few express tendencies. But all the indicators are, without exception, in the form of averages, proportions, ratios, rates or certain more synthetic functions of the basic data.

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14 The Use of Socio-Economic Indicators in Development Planning, op. cit., p.13.

In the present study, the total vector selected for analysing the district-wise pattern of development at two points of time (1970-71 and 1980-81) comprise 31 indicators, out of which a sub-vector of 9 indicators is chosen to portray levels and patterns of agricultural development for different districts. Whereas another sub-vector of 7 indicators is considered to analyse patterns of industrial development. Since the pattern and development of agricultural and industrial sectors are inter-alia influenced by the availability of infrastructural facilities, a sub-vector of 10 indicators is taken into account for showing the district-wise level of economic infrastructure. Moreover, a sub-vector of five indicators is chosen to measure the development levels of social services. The rationale for making choice of aforesaid indicators is described in subsequent paragraphs.

5. Rationale for Choice in the Study

As a matter of fact, determination of the validity of the indicators is one of the crucial problems in social research because of its selection being quite arduous.[15] In spite of knowing very well the gravity of this major problem, efforts have been made in the following paragraphs to provide rationale for selecting the indicators and giving empirical content to various concepts used to measure and analyse the levels of development of different districts.

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15 Germani, G., Migration and Acculturation, in Hauser, P.M. (ed.), Handbook for Social Research in Urban Areas, UNESCO, Paris, 1964.

(i) Agricultural Development

In most of the studies conducted in the field of agricultural development the focus is generally centred around the analysis of technological input-output relations. To depart from this traditional way of analysing the situation, efforts have, therefore, been made here to represent agricultural development by considering not only output and input indicators but also those relating to modernisation and technological break-through in agriculture as would be evident from the following :

A_1 Gross value of agricultural produce per ha. of net area sown;

A_2 Gross value of agricultural produce per capita of rural population;

A_3 Gross value of agricultural produce per agricultural worker;

A_4 Intensity of cropping;

A_5 Percentage of area under commercial crops to gross cropped area;

A_6 Percentage of area under high yielding varieties to gross cropped area;

A_7 Consumption of fertilizer per ha. of gross cropped area;

A_8 Consumption of power per ha. in agriculture; and

A_9 Percentage of net irrigated area to net area sown.

The above mentioned indicators can broadly be classified into three groups. The first group consisting of A_1, A_2 and A_3 indicators relates to the overall performance of agriculture, the indicators A_4, A_5 and A_6 falling in the second group are those directly associated with the first group and those (A_7,

A_8 and A_9) belonging to the third group and known as causal factors contribute favourably to the indicators of both the first and the second groups. In other words, the use of fertilizer, power and irrigation (third group) helps in augmenting the cropping intensity and the area under both the high yielding varieties and commercial crops (second group), which, in turn, have a direct bearing on the performance of agriculture in terms of higher yield rates (first group).

The indicators A_1, A_2 and A_3 have been selected to exhibit the overall performance of agriculture in terms of agricultural productivity, labour productivity and availability of agricultural produce for consumption of the population, besides showing the effects of all technological inputs on land. However, they are likely to duplicate the effects of the factors of modern intensive cultivation because separate indicators pertaining to the latter have also been incorporated.

The intensity of cropping A_4, which is measured through the ratio of gross to net cropped area, indicates the rate of utilisation of net area under cultivation in different districts and throws light on the scope of bringing additional area under multiple cropping. It is deemed to be a composite-end-expression of area, yield and cropping pattern. The percentage of area under commercial crops to gross cropped area A_5 indicates the level of diversification within agriculture

from foodgrain to commercial crops and also shows efficiency of farm management. It also points out to the market orientation of agriculture in different districts. Moreover, the proportion of area under high yielding varieties to gross cropped area A_6, which is an outcome of utilisation of several inputs like improved seeds, fertilizer, power and irrigation, shows the extent of modernisation in agriculture.

The indicators of consumption of fertilizer per ha. of cropped area A_7 and consumption of power per ha. in agriculture A_8 have been selected as complementary inputs, playing a significant role in modernising the agriculture. On the other hand, percentage of net irrigated area to net area sown A_9 reflects another aspect of the development of modern agriculture. Apart from raising intensity of cropping, irrigation is also multi-collinear with the application of fertilizer and the use of high yielding varieties of seeds.

(ii) Industrial Development

Besides agriculture, industrial sector also plays an important role in the economic development of different districts. Industrial units of organised sector generally provide life blood to the economic system by their leading role in transmitting growth impulses to the surrounding areas through their backward and forward linkages. Moreover, most of the infrastructural facilities such as power and banking expand alongwith the industrial development while their

availability in the area causes concentration of industries.[16] The level of industrial development can be measured by using indicators of different characteristics. But in the present case, attempt has been made to measure it for different districts by taking into account the following seven indicators.

B_1 Percentage contribution of industrial sector to total net domestic product;

B_2 Value added by manufacture per industrial worker;

B_3 Value of industrial output per kwh consumption of electricity;

B_4 Concentration of all factories per 000 sq. km. of area;

B_5 Workers engaged in industrial sector per sq. km. of area;

B_6 Percentage of household industrial workers to total workers; and

B_7 Percentage of other workers to total workers.

The above mentioned indicators can broadly be classified into two groups. The first group consists of first three indicators B_1, B_2 and B_3 which are primarily concerned with performance of industrial sector, whereas those constituting the second group include the remaining four indicators B_4, B_5, B_6 and B_7 which, by and large, exhibit the degree of concentration of industrial activities in different districts.

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16 Hilhorst, J., Regional Development Theory - An Attempt to Synthesise, in OECD (Ed.), Multi-Disciplinary Aspects of Regional Development.

The indicator B_1 is selected to show the degree of predominance of industrial sector in overall economy of the district. Whereas income generating from the manufacturing process per industrial worker and per kwh consumption of electricity is depicted by the indicators B_2 and B_3 respectively. The choice of these indicators is done to show separately the degree of contribution made by industrial workers and the use of power/electricity. The indicator B_4 is included in the analysis because of the leading role of factory units in transmitting growth impulses to their surrounding areas. Besides, the degree of concentration of workers in non-agricultural sectors is measured by making choice of indicators B_5, B_6 and B_7.

(iii) Economic Infrastructure

One cannot undermine the importance of catalytic role that economic infrastructure plays in the process of both economic and social development. Apart from providing better links to different areas through transport and communication facilities it also assists in enhancing accessibility to countrysides. Hence inter-district comparisons would probably remain incomplete without giving due weightage to this aspect in the geographical space. Taking this argumentation as the basis, the following ten indicators have been chosen to exhibit the development of economic infrastructure. The two aspects that have been given due consideration in the present context are the level of infrastructural facilities per unit of

geographical area and the proportion of the total population that partake in these facilities.[17]

C_1 Length of pucca roads per 000 sq. km. of area;

C_2 Length of pucca roads per lakh of population;

C_3 Percentage of villages situated within 3 kms. from pucca road;

C_4 Percentage of villages situated within 3 kms. from railway station;

C_5 Percentage of villages situated within 3 kms. from bus stop;

C_6 Percentage of villages electrified to total villages;

C_7 Number of bank offices per lakh of population;

C_8 Number of veterinary hospitals per lakh of livestock population;

C_9 Number of fertilizer-cum-seed stores per 000 sq. km. of area; and

C_{10} Number of tubewells/pumpsets per 000 ha. of net area sown.

The indicators C_1, C_2, C_3, C_4 and C_5 have been selected for measuring the level of development of road and transport infrastructure. The density of population in districts of the hill region is extremely low as compared to that of the plains. Therefore, when population is used as denominator, the length of pucca roads per lakh of population in respect of hill districts automatically becomes inflated, whereas when geographical area is taken as a denominator, the corresponding figure is reduced significantly. In view of these opposing

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17 Lewis, O., Further Observation on the Folk-Urban Continuum and Urbanisation with Special Reference to Mexico City, in Hauer, P.M. and Schnore, L.F. (Ed.) The Study of Urbanisation, John Wiley and Sons, New York.

tendencies, we have selected two separate indicators C_1 based on population and C_2 based on area in order to nullify such abnormalities. While selecting the next three indicators C_3, C_4 and C_5, the main focus is on examining the availability of transport facilities in the villages rather than cities and towns. The percentage of villages electrified to total number of villages C_6 has been selected as one of the indicators, since the rural electrification is considered as supporting agricultural development by bringing about ancillary activities in the villages. The indicator C_7 is selected because bank offices play a pivotal role in catering to the financial needs of the villagers through advancing loans for the development of agriculture and industry. Whereas the choice of indicator C_8 is made to show the extent of veterinary services available in different districts for providing proper health cover to the existing livestock population. Lastly, the indicators C_9 and C_{10} are selected because of their significant role in modernisation of agriculture.

(iv) Social Services

In the light of the role that human capital has to play in economic development, the social services (mainly health and education), which greatly assist in the process of developing human capital, automatically become of paramount importance. Even the country derives its vitality from these two sources of education and health. Accepting this as the basis for evaluation, attempt has been made here to measure

the availability of social services in different districts, by using the following five indicators :

D_1 Number of junior basic schools per lakh of population;

D_2 Number of senior basic schools per lakh of population;

D_3 Number of higher secondary schools per lakh of population;

D_4 Number of hospitals/dispensaries (allopathic) per lakh of population; and

D_5 Number of hospital beds per lakh of population.

The indicators D_1, D_2 and D_3 have been included in the study to show the inter-district variations in levels of educational infrastructure. In majority of the districts, strength of allopathic hospitals and dispensaries is not adequate to serve the demand of the existing population for medical and health facilities. Besides, there is a wide variation in the availability of these facilities from one district to another. It is, therefore, felt imperative to select indicators D_4 and D_5, considering population as a denominator.

Chapter III

CONSTRUCTION OF COMPOSITE INDICES AND CLASSIFICATION OF DISTRICTS

From the analytical framework provided in the earlier chapters it is clear that an assessment and analysis of district-wise pattern of development will involve use of the selected socio-economic indicators.[1] Now in this chapter we plan to provide details of the methodology to be adopted in the present case for working out district-wise composite indices of development for overall economy and the selected key sectors. As stated previously, the problem, which is deemed to be the most crucial in multivariate analysis, is that of contracting a large number of variables into few indices so that analysis pertaining to inter-district comparisons of development levels can precisely be attempted. Important among the various approaches suggested for this purpose are the construction of composite index of development for each district and the construction of an index of composite distance between every pair.[2] However, in the present case, we have decided to follow the former approach obviously because of its better relevance.

1. Review of Previous Studies

If we go back to the previous literature of this subject

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1 Henceforth, the terms 'indicator' and 'variable' have been used interchangeably.

2 Mahalnobis, P.C., On the Generalised Distance in Statistics, Proceedings of the National Institute of Science of India, 2, 1936.

we find that quite a large number of studies have been accomplished to work out composite index of development for different districts, using various kinds of development criteria. The studies conducted prior to seventies have, in general, followed an approach involving a simple aggregation of rankings of areal units. Bennet, for example, constructed composite index of development taking into account the monetary and non-monetary physical factors to effect comparisons between pre-war consumption and material well-being in 31 countries.[3] Adelman et al modified Bennet's analysis by incorporating additional variables.[4] Mitra considered about 24 indicators for classifying various districts of India on a ranking basis.[5] Moreover, Nanjappa used an approach involving a simple aggregation of the ranking of districts in Karnataka state based on 15 indicators.[6] Besides, Pande Committee adopted a similar kind of ranking approach at the all-India level to identify industrially backward districts.[7] However, a serious shortcoming of these studies as noticed by the researchers is that while combining various physical variables or indicators authors have either given weights arbitrarily or have left them without assigning weights. Since the variables carry differences among themselves

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3 Bennet, M.K., International Disparities in Consumption Levels, American Economic Review, XLI, September 1951, pp.632-649.

4 Adelman, et al., Economic Development Analysis : Case Studies, Universal Book Stall, New Delhi, 1967.

5 Mitra, A., op cit.

6 Nanjappa, M.B., Backward Areas in Mysore State : A Study in Regional Development, Southern Economists, 1968.

7 Pande, B.D., Identification of Backwardness, Report of the Working Group, Government of India, Planning Commission, New Delhi, February-March 1969.

according to their relative importance, assignment of equal weights was deemed to be one of the major criticism of this method. Hence, these studies suffered from the subjective element and the use of objective criteria was not found in them. With the result, the studies, which were conducted during seventies, tried to overcome this problem through frequent use of Factor Analysis.

Rao, for example, following the method of principal component analysis identified the backward states, taking into account 15 indicators of different socio-economic characteristics.[8] M.N. Pal followed the method of first principal component analysis to work out composite index of development by using 17 indicators of agriculture, secondary activities, tertiary activities and urbanisation.[9] Moreover, Hemlata Rao used multiple factor analysis approach for measuring economic distance between the states of India.[10] Mukherjee and Rao have recently prepared a more sophisticated approach analogous to factor analysis.[11] Besides, Hellwig constructed an index of development for inter-country analysis in the form of a weighted average, where weights are assumed

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8 Rao, S.K., A Note on Measuring Economic Distances Between Regions in India, Economic and Political Weekly, April 28, 1973.

9 Pal, M.N., op. cit.

10 Rao, Hemlata, Identification of Backward Regions and the Trends in Regional Disparities in India, Artha Vijnana, Vol.9, No.2, 1977, pp.93-112.

11 Mukherjee, K. and Rao, S.K., A Method of Combining Diverse Partial Measure of Development, The Journal of Income and Wealth, Vol.2, No.1, 1977, pp.48-51.

to be inversely proportional to the coefficients of variation.[12] Lastly, Iyenger, et al developed a similar kind of index for measuring the level of development of different districts in Karnataka State.[13]

Thus, we find that the studies conducted in seventies have generally been 'weightage' oriented and inter-regional comparisons in development levels have been attempted through construction of composite index of development by assigning weights to selected indicators. The factor analysis[14] has been preferred as a statistical technique for determining weights of the selected indicators and identifying basic factors which are crucial for the development of key sectors of the economy. The first step involved in factor analysis is to clearly define the universe of the analysis because the nature and the scope of the indicators have crucial implications

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12 Hellwig, A., On the Problem of Weighing in International Comparisons in 'Towards a System of Human Resources for Less Developed Countries', ed. by Gestkowski, Institute of Philosophy and Sociology, Polish Academy of Sciences.

13 Iyenger, N.S., Nanjappa, M.B., and Sundershan, P., A Note on Inter-District Differentials in Karnataka's Development, Journal of Income and Wealth, Vol.5, No.2, 1981.

14 Harman Harry H., Modern Factor Analysis, University of Chicago, Third Impression, 1970, pp.13-14. The basic factor model may compactly be expressed as follows :

$Z_j = a_{j1} F_1 + a_{j2} F_2 + ... + a_{jm} F_m + d_j U_j \quad (j = 1, 2..., n)$

where,

Z_j = variable j in standardised form

F_i = hypothetical factors

U_j = unique factor for variable j

a_{ji} = standardised multiple-regression coefficient of variable j on factor i (factor loading)

d_j = standardised regression coefficient of variable j on unique factor j

for the factor results and their possible interpretation. The correlation matrix, which is basic input to the factor analysis, can be constructed both between each pair of variables or social characteristics (R-Type) and between each pair of individuals (Q-Type). The former is known as R-Factor Analysis and the later is called Q-Factor Analysis.[15]

The second step associated with the factor analysis is to explore the possibilities of data reduction by constructing a set of new variables on the basis of the inter-relations demonstrated by the correlation matrix. In doing so, one can define new variables as convenient variate transformations of the original data or make inferential assumptions about the structuring of variables. The former approach, which uses defined variables is called principal component analysis, whereas the latter, which uses inferred variables, is termed as common factor analysis. The common factor analysis, which is primarily concerned with identification of basic factors playing an important role in development of key sectors of the economy, has not been considered here because it does not fall directly within the purview of this study. Since the major thrust of the present study is to analyse the pattern of development, we have decided to apply the technique of principal component analysis for working out the composite indices of development in respect of both the overall economy and the selected key sectors.

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15 Statistical Package for the Social Sciences (SPSS), MC. Gra-Hill Book Company, New York, pp.209-210.

2. Principal Component Analysis

The principal component analysis, which is a branch of well known multivariate technique of factor analysis, is a relatively straight forward method of transferring a given set of variables or indicators into a new set of composite variables or principal components that are orthogonal (uncorrelated) to each other. It is designed primarily to synthesise a large number of variables into a smaller number of general components which retain the maximum amount of descriptive ability. An empirical method for the reduction of a large body of data with a view to extracting the maximum of the variance was first proposed by Pearson[16] and later on fully developed as the method of principal components or component analysis by Harold Hotelling.

The above method does not require any assumption about the underlying structure of the variables. One has simply to find out the best linear combinations of variables or indicators. In other words, one tries to identify the particular combination of variables which could account for maximum of the variance in the data matrix than any other linear combination of variables. The first principal component may, therefore, be viewed as the single best summary of linear relationships demonstrated in the data. The second component

16 Pearson, Karl, On Lines and Planes of Closest Fit to Systems of Points in Space, Philosophical Magazine (6), 1901, pp.559-72.

17 Hotelling, Harold, Analysis of a Complex of Statistical Variables into Principal Components, Journal of Educational Psychology, Vol.24, 1933, pp.417-41 and 498-520.

is defined as the second best linear combination of variables, under the condition that the second component is orthogonal to the first. To be orthogonal to the first component, the second one must account for the proportion of the variance not accounted for by the first one. Similarly, the second component may be defined as the linear combination of variables that accounts for the most residual variance after the effect of the first component is removed from the data. The subsequent components are defined in the same manner until all the variance in the data is completely exhausted. Unless at least one variable is perfectly determined by the rest of the variables in the data, the principal component solution requires as many components as there are variables. The sum of the variances of all the principal components is equal to the sum of the variances of the original variables.[18]

The full-fledged principal component model can be expressed as follows :

$$Z_j = a_{j1} P_1 + a_{j2} P_2 + \ldots a_{ji} P_i + \ldots a_{jn} P_n$$

where

Z_j, i = 1 to n, are the standardised values of the observed variables;

P_1, i = 1 to n, are the new uncorrelated components; and

a_{j1}, i = 1 to n, and i = 1 to n, the coefficients are the 'factor loadings' or 'weights'.

Each of the n observed variables is described linearly in terms of n new uncorrelated components P_1, P_2 ... P_n, each of

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18 Harman, Harry H., op. cit., p.13.

which is, in turn, defined as a linear combination of the n original variables.[19] Since each component is defined as the best linear summary of variance left in the data after the previous components are taken care of, the first m components usually much smaller than the number of variables in the set may explain most of the variance in the data.

In the above model, the factor loadings, or coefficients of principal components are the correlations of the variables with the principal components. Thus, a_{ji}, is correlation of variable Z_j with the principal component P_i. Principal components are linear combinations of standardised variables with weights in terms of factor loadings. Thus, principal component P_i is determined as :

$$P_i = \sum_{j=1}^{n} a_{ji} \cdot Z_j,$$

or

$$P_i = a_{1i} \cdot Z_1 + a_{2i} \cdot Z_2 + \ldots + a_{ni} \cdot Z_n$$

But we have not adopted the full-fledged principal component analysis as such in the present study. As a matter of fact, the principal component analysis is an empirical technique of breaking down a correlation of covariance matrix into a set of orthogonal components or axes equal in number with that of original variates.[20] And in that context, to formulate any hypothesis or underlying assumption about original

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19 SPSS, op. cit., p.120.

20 Pal, M.N., op. cit., p.35.

variables is not necessary. But in our present study, since we attempt to workout composite index of development we depend largely upon the variables which are indicative of development and hence positive relationships among variables are expected to exist. Secondly, the composite index of development should, in principle, be only one, whereas the principal component analysis does not reduce the number of original variables or indicators. Therefore, we have employed the technique of first principal component analysis to work out the composite index of development.

The first principal component (p_1) is that linear combination of weighted variables which explains the maximum of the total variance. The model can be put as :

$$P_1 = \sum_{i=1}^{n} a_{ji} \cdot Z_j$$

where,

a_{ji} = factor loadings or weights; and

Z_j = standardised value of the observed variable.

Thus, the first principal component, which gives maximum correlation with variables and explains maximum of the total variance, is considered as composite index of development for a vector.

Since the present study aims at analysing the inter-district comparisons of relative levels of development, the method of first principal component analysis at two stages is preferable. At the first stage, the first principal component analysis is applied

to indicators of each of the identified sub-vectors (agriculture, industry, economic infrastructure and social services). At the second stage, the first principal components obtained from the first four identified sub-vectors are treated as a set of new variables and again the first principal component of these variables is derived to obtain the final composite index of all the initial variables of first four sub-vectors constituting the total vector. This method alleviates the necessity of taking more than one principal component, since the correlations among the variables in each of the identified sub-vectors are generally high and therefore the first principal component arrived at in the second stage explains an adequate proportion of the total variance in the data matrix.[21]

In the above context it may, however, be argued that instead of computing several first principal components separately for each of the first four identified sub-vectors why one should not compute the first principal component (representing the composite index of development) from the pooled correlation matrix involving all variables of these sub-vectors together. We have not followed this technique because of the two-fold reasons. First, specific indicators of development need not be independent while the principal components must, by very assumption, be orthogonal. Second, the economic interpretation of the first principal component worked out by considering all

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21 Girsick, M.A., Principal Components, Journal of the American Statistical Association, Vol.31, 1936, pp.519-28.

the variables of the first four identified sub-vectors together would be very difficult because of the involvement of too much abstraction.[22]

While dealing with the technique of first principal component analysis one has to take appropriate decisions regarding the two major issues, i.e., scale of measurement and assignment of weights. The indicators selected for working out composite indices are generally measured in different units and hence they are not directly additive. Since this technique is so dependent on the total variance of original variables, it becomes necessary to convert them into some standard units so that the initial scale selected for measuring the variables do not bias the results.[23] Otherwise, by change of units or other linear transformations of the variables, the ellipsoids could be squeezed or stretched so that their axes (the principal components) would have no special meaning. Hence, it is customary to express the variables in standard forms, i.e., to select the unit of measurement for each variable so that its sample variance is one. In order to eliminate the bias of scale, several methods have been suggested.[24] Important among these methods are division by mean, division by standard deviation, normalisation, division by an 'ideal' value and standardisation. However, in the present case we made choice

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22 Pal, M.N., op. cit., p.36.

23 Kendall, M.G., The Geographical Distribution of Crop Productivity in England, The Journal of Royal Statistical Society, 1939, No.102.

24 Sen, A.K., On Economic Inequality, Oxford University Press, Delhi, 1973, p.5.

of standardisation. This method, which was widely used by the western geographers,[25] tries to remove the scale effect by dividing the deviation of each observation from the mean by the standard deviation. A measure of standardisation (Z_{ij}) is defined as :

$$Z_{ij} = \frac{X_{ij} - \bar{X}_j}{\sigma X_j}$$

where,

X_{ij} = value of X_j variable on i^{th} observation;

$\bar{X}_j$ = mean value of X_j variable; and

σX_j = standard deviation on the X_j variable

After eliminating biasness of scale, the crucial problem in preparing a composite index is that of assigning mathematical weights to variables. If each element of an eigen vector, corresponding to the eigen value λi and normalised to unity, is multiplied by the square root of their respective eigen values (i.e., $\sqrt{\lambda i}$), a new series thus found become the coefficients of correlation of the i^{th} principal component with each of the n variables. These coefficients of correlations are also known as factor loadings or weights.[26]

In the principal component matrix, the eigen values associated with each component represent the amount of total variance accounted for by the factor. Therefore, the importance of a component may be evaluated by examining the proportion of

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25 Berry, Brian, J.L., et al., (ed.), Spatial Analysis, Prentice Hall, Inc., Englewood Cliffs, New Jersey.

26 Mahmood, Aslam, Statistical Methods in Geographical Studies, 1977, Rajesh Publications, New Delhi, p.155.

the total variance accounted for as follows :

> Proportion of total variance accounted for by the component 'i' = $\frac{\lambda i}{n}$ where, λi represents the eigen value of i^{th} component and n represents the number of variables in the set.

In other words, this indicates the descriptive power of each component expressed as λi. Moreover, the component, which corresponds to the highest eigen value is designated as the first principal component. Similarly, the principal components, which correspond to 2nd highest, 3rd highest, 4th highest, . . . and the last eigen values, are called second, third, fourth and n^{th} principal components. It is generally found that the first few components having higher variances account for most of the total variance in the data and that the remaining components account for only small amount of variance that are often due to idiosyncratic variations in the individual variables.[27] To be more specific, the first component accounts for a proportion of $\lambda i/n$ of the total variation, the first two for proportion $(\lambda 1 + \lambda 2)/n$, and so on. It is convenient to use expressions such as first four components account for P per cent of the total variation. In factor analysis, it is customary to accept all those components with $\lambda i > 1$ and disregard the others. But in our case, the first component would serve the purpose because

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27 SPSS, op. cit., p.219.

factor loadings of the selected indicators corresponding to only first principal component have been used to work out composite indices of development.

3. Classification of Districts

For the purposes of convenient and meaningful analysis, all the 56 districts have been divided into four categories (i.e., High, Medium High, Medium Low and Low) in terms of composite index slabs in descending hierarchy, referring to 1970-71, the initial year of the time period considered here. To explain, if A, B, C and D denote the lower limits of the intervals in descending order, then A and C were obtained as arithmetical mean values of the composite indices for the districts falling respectively above and below the state level arithmetical mean (X). The value of B was determined by working out arithmetical mean value of composite indices for districts falling in the range A-X. The value of D is obviously the lowest value of composite indices across the districts. The four categories, thus, arrived at are constituted by the districts falling between (i) A and above; (ii) B and A; (iii) C and B; and (iv) D and C. This procedure for dividing districts into four categories was followed not only in respect of overall development but also the development of agriculture, industry, economic infrastructure and social services.

Finally, the classification of districts into above mentioned four categories for 1980-81 has been done by taking into account the class-intervals of different categories of development already used for such classification in 1970-71.[28] This enables us to analyse conveniently the upward or downward movements of different districts in levels of development during 1980-81 over the base year 1970-71.

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28 A majority of the indicators considered in this study are in physical terms and the very few indicators are in value terms. The latter have been used for 1980-81 only after converting them at constant prices of 1970-71 in order to make district-wise composite indices of development comparable both horizontally and vertically.

Chapter IV

PATTERNS OF OVERALL DEVELOPMENT

The primary objective in this chapter is to analyse the changes in district-wise pattern of development that occurred during 1980-81 as a result of the planned development efforts made in seventies in terms of mainly adoption of new development strategy, emphasising maximum possible use of local resources through implementation of various development programmes based on 'Area Development' and 'Target Group' approaches. In this connection, two major aspects of development would merit a detailed examination : first, the spatial patterns of overall development alongwith measurement of inter-district disparities and second the sectoral patterns of development emerging from the changes in sectoral compositions of income and employment. In case of the former, efforts would be made here to measure and analyse the district-wise composite index of overall development alongwith upward or downward movements of districts in levels of development, besides assessing the magnitude of inter-district disparities at the selected two points of time, i.e., 1970-71 and 1980-81.

Whereas the latter would be attempted through analysing the district-wise development structure, focussing on the mix of development elements in each district. Precisely, the changes in inter-sectoral compositions of net domestic product (NDP) and employment are, inter-alia, deemed to be an indicative of changes in sectoral patterns of development of different districts. This is simply because there appears to be strong association between the patterns of development on one hand, and the economic

structure on the other. The higher proportions of net domestic product and employment in secondary as well as tertiary sectors are likely to result in more diversified structure of economy, showing a contrast from the economy which is still predominantly agrarian.

It is difficult as well as cumbersome to carry out inter-district analysis of patterns of overall development and examine its relationship with key sectors of the economy by taking into account the individual indicators and analysing their role separately. Therefore, efforts have been made in the present context to analyse these aspects with the help of their composite indices. Secondly, for the sake of convenience and meaningful analysis, all the 56 districts of Uttar Pradesh have been divided into High (H), Medium High (MH), Medium Low (ML) and Low (L) categories, using arithemetical mean of composite indices of development of different districts in 1970-71 as a sole criterion, details of which have already been given in the third chapter. The districts, which occupy place in 'High' category, are supposed to have been passing through the 'take off' stage, whereas those occupying their places in 'Medium High' and 'Medium Low' categories are considered to be in the transitional phase of development. Lastly, the districts, which are designated as 'Low', are still supposed to have their agriculture usually in a rudimentary form, resulting in a subsistence level of economy.

1. Spatial Patterns of Development

As stated in the introductory chapter, we have constructed district-wise composite indices of development separately for each of the key sectors of the economy, i.e., agriculture, industry, economic infrastructure and social services. But these

indices by themselves are not sufficient to indicate the overall development of different districts. It is quite likely that some of the districts are developed with respect to agriculture but they might be less developed with respect to some other sectors. Therefore, when these indices are treated separately for analytical purposes, it would be very difficult to get overall view of development for different districts. In order, therefore, to analyse this strategic issue in an aggregative term, the above mentioned four indices i.e., agriculture (A), industry (B), economic infrastructure (C), and social services (D) are treated as a raw data to arrive at a new first principal component. The factor loadings of these four indices corresponding to the latter have been used to construct the composite indices of overall development. The correlation matrices of these four indices separately for the years 1970-71 and 1980-81 are given below :

Table 4.1 Inter-Correlation Matrix : 1970-71

	A	B	C	D
A	1.0000			
B	0.45681	1.0000		
C	0.76339	0.56207	1.0000	
D	0.33814	0.97892	0.58768	1.0000

Number of observations = 56

Table 4.2 Inter-Correlation Matrix : 1980-81

	A	B	C	D
A	1.00000			
B	0.45734	1.00000		
C	0.76474	0.45891	1.00000	
D	0.40481	0.42093	0.55099	1.00000

Number of observations = 56

The above tables reveal that these four indices are associated positively with each other in both the years (1970-71 and 1980-81). As regards 1970-71, the first principal component explains 62 per cent of the total variation. The equation for the composite index (Z) stands as :

$$Z = (0.85110)\ A + (0.66735)\ B + (0.95210)\ C + (0.61748)\ D$$

where, A, B, C and D are standardised values of the variables and figures given in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z with each of the four indices are positive and as high as .85, .67, .95 and .62 respectively. On the other hand, in respect of 1980-81 we observe that the first principal component explains 64 per cent of the total variation. The equation for composite index (Z) is as follows :

$$Z = (0.87641)\ A + (0.62863)\ B + (0.91931)\ C + (0.65350)\ D$$

where, A, B, C and D are values of the variables in the standardised form and figures given in parentheses are 'factor loadings' or 'weights'.

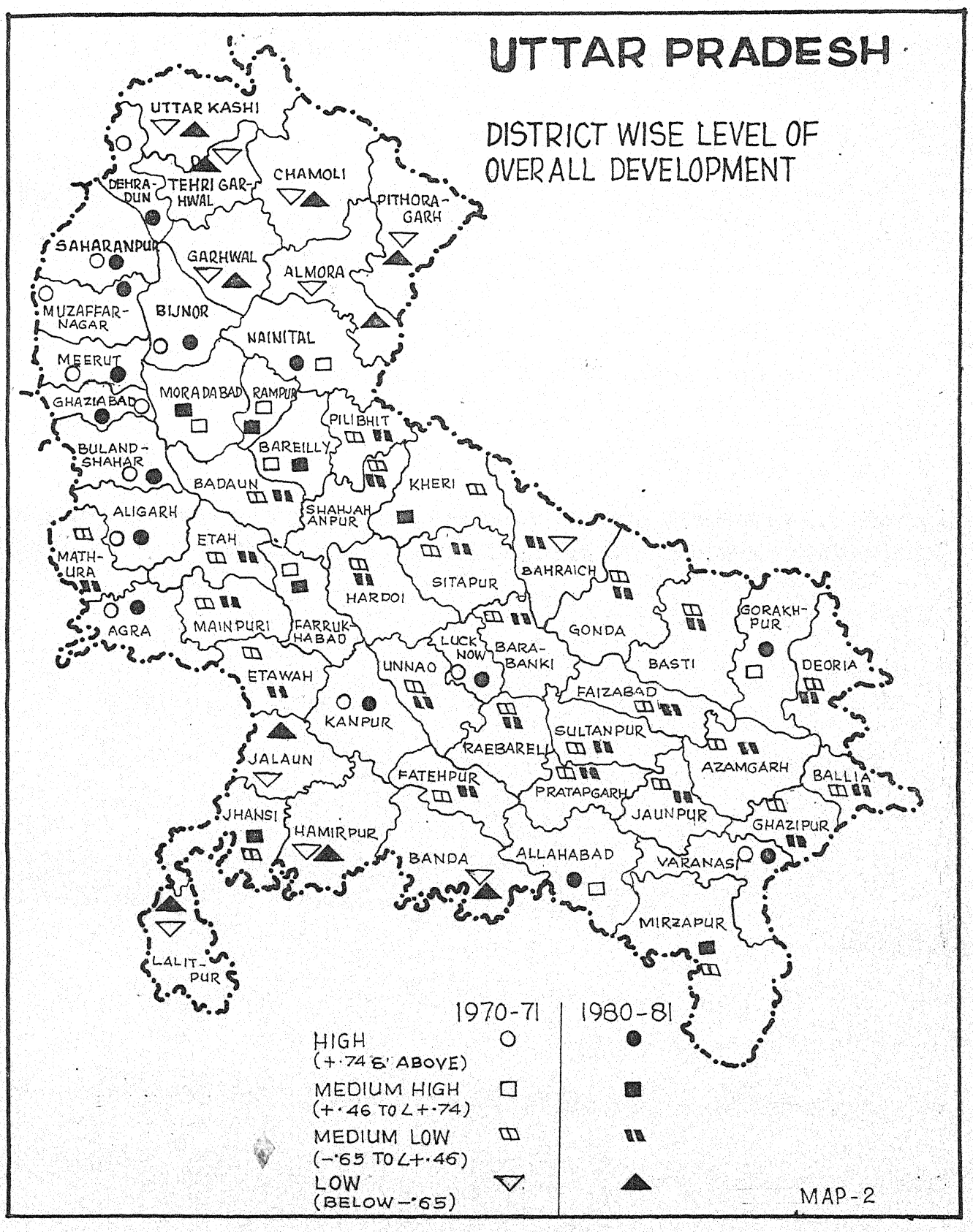
The coefficients of correlation of Z with each of the four indices are, in this case also, positive and as high as .88, .63, .92 and .65 respectively. The estimated values of the district-wise composite indices of development for overall economy and the selected key sectors separately for the years 1970-71 and 1980-81 are placed at appendix II. The classification of districts according to composite indices of overall development into four categories (High, Medium High, Medium Low and Low) is given in the following table :

Table 4.3 Classification of Districts According to Composite Index of Overall Development

Category of development	1970-71	1980-81
1. High (+.74 and above)	Meerut, Ghaziabad, Muzaffar Nagar, Saharanpur, Kanpur, Bulandshahar, Varanasi, Bijnor, Lucknow, Aligarh, Agra, Dehradun (12)	Meerut, Ghaziabad, Muzaffar Nagar, Bulandshahr, Kanpur, Lucknow, Saharanpur, Dehradun, Varanasi, Bijnor, Nainital, Agra, Allahabad, Gorakhpur, Aligarh. (15)
2. Medium High (+.46 to < +.74)	Allahabad, Gorakhpur, Bareilly, Rampur, Nainital, Moradabad, Farrukhabad (7)	Moradabad, Kheri, Bareilly, Rampur, Mirzapur, Jhansi, Farrukhabad (7)
3. Medium Low (-.65 to < +.46)	Mathura, Rae Bareli, Jaunpur, Ghazipur, Faizabad, Azamgarh, Barabanki, Etawah, Kheri, Ballia, Pilibhit, Mainpuri, Etah, Basti, Shahjahanpur, Pratapgarh, Sultanpur, Badaun, Gonda, Deoria, Unnao, Hardoi, Sitapur, Fatehpur, Mirzapur, Jhansi (26)	Etawah, Rae Bareli, Faizabad, Mathura, Jaunpur, Barabanki, Azamgarh, Deoria, Ghazipur, Fatehpur, Ballia, Badaun, Pilibhit, Mainpuri, Etah, Shahjahanpur, Pratapgarh, Sultanpur, Basti, Unnao, Sitapur, Hardoi, Gonda, Behraich (24)
4. Low (Below -.65)	Jalaun, Behraich, Lalitpur, Banda, Hamirpur, Garhwal, Chamoli, Almora, Uttarkashi, Tehri Garhwal, Pithoragarh (11)	Jalaun, Lalitpur, Banda, Hamirpur, Almora, Pithoragarh, Chamoli, Tehri Garhwal, Garhwal, Uttarkashi (10)

(Above classification is also shown in Map-2)

According to the above table, a number of districts falling in the category of high level of development showed an increase from twelve in 1970-71 to fifteen during 1980-81. The remaining 41 districts, which are still found to be underdeveloped or developing, are designated as less developed districts (LDDs). A closer examination of the above table indicates that the


UTTAR PRADESH
DISTRICT WISE LEVEL OF OVERALL DEVELOPMENT
UTTAR KASHI
CHAMOLI
DEHRA-DUN
TEHRI GAR-HWAL
PITHORA-GARH
SAHARANPUR
GARHWAL
ALMORA
MUZAFFAR-NAGAR
BIJNOR
NAINITAL
MEERUT
GHAZIABAD
MORADABAD
RAMPUR
PILIBHIT
BULAND-SHAHAR
BAREILLY
BADAUN
KHERI
ALIGARH
SHAHJAHANPUR
ETAH
MATH-URA
SITAPUR
BAHRAICH
HARDOI
AGRA
MAINPURI
FARRUK-HABAD
LUCK-NOW
BARA-BANKI
GONDA
GORAKH-PUR
UNNAO
BASTI
DEORIA
ETAWAH
FAIZABAD
KANPUR
SULTANPUR
RAEBARELI
JALAUN
AZAMGARH
BALLIA
FATEHPUR
PRATAPGARH
JHANSI
HAMIRPUR
JAUNPUR
GHAZIPUR
BANDA
ALLAHABAD
VARANASI
MIRZAPUR
LALIT-PUR
1970-71
1980-81
HIGH (+·74 & ABOVE)
MEDIUM HIGH (+·46 TO < +·74)
MEDIUM LOW (-·65 TO < +·46)
LOW (BELOW -·65)
MAP-2

districts of Allahabad, Gorakhpur and Nainital, which could find place in the category of 'medium high' level of development in 1970-71, moved an upward and attained 'high' level of development during 1980-81. Similarly, the districts of Kheri, Mirzapur and Jhansi, which occupied their positions in the category of 'medium low' level of development in 1970-71, attained 'medium high' level of development during 1980-81. Moreover, district Behraich moved to the next higher stage of development from 'low' in 1970-71 to 'medium low' during 1980-81. Thus, in cases of these seven districts there occurred an upward movement in levels of development from their original categories to the next higher ones during the previous decade.

Moreover, the district-wise analysis of absolute values of composite indices of overall development at two points of time suggests that although there has been some significant variations in the order of rankings of districts separately in each of the categories, the inter-district upward movements in levels of development between the categories occurred in cases of the above mentioned seven districts only. The absolute index values of overall development for quite a large number of districts have shown a general increase in 1980-81 as compared to the year 1970-71, reflecting a considerable rise in levels of their overall development. The grouping of districts into four different categories in 1970-71 has also shown some significant changes during 1980-81. Besides, the number of districts occupying positions above the state level arithemetical mean of composite indices of overall development for all the 56 districts also showed an increase from 33 in 1970-71 to 35 during 1980-81. In other words, the two districts namely Badaun and Deoria,

which although still fall in the category of medium low level of development, have made progress in their economy to the extent that they could occupy their positions above the state level.

Thus, through analysing the behaviour of and the changes in our district-wise composite index of development for two selected static years (1970-71 and 1980-81) we observe that besides an increase in the values of composite indices of overall development in most of the districts during 1980-81 over the base year 1970-71, some definite improvements in the district-wise pattern of ranking are also perceptible. But the ranks of the top 3 and bottom 3 districts in both the years points out to the fact that developed districts continued to dominate in inter-district pattern of development, whereas the districts falling in the category of low level of development could not bring diversification in their economy to the extent required for a change in their ranking pattern.

Inter-district disparities in levels of development for each of the economic regions and whole of Uttar Pradesh are shown in the following table :

Table 4.4 : Arithemetical Means And Coefficients of Variation of Composite Indices of Overall Development

Economic Regions	Number of Districts	Arithmetical Mean		Coefficients* of Variation (%)	
		1970-71	1980-81	1970-71	1980-81
1.Western	19	0.2642	0.2877	213.2106	200.9288
2.Central	9	0.0279	0.0618	910.3614	490.6670
3.Eastern	15	0.0031	0.0311	9238.4780	943.7360
4.Bundelkhand	5	-0.1004	-0.0691	-341.9641	-301.4348
5.Hill	8	-0.1843	-0.1555	-343.0193	-311.6086
U.P.	56	0.0534	0.1835	1903.3880	566.6569

*At 1 per cent level of significance.

Two interesting things are discernible from the above table. First, from an increase in the arithmetical mean of composite indices of overall development for each of the economic regions and whole of Uttar Pradesh during 1980-81 over the base year 1970-71 it seems that there has been some definite improvements in levels of overall development both at the regional and state levels. Second, a general decline in coefficients of variation of composite index of development in different economic regions and whole of Uttar Pradesh indicates that there has been a significant reduction in inter-district disparities in levels of development during 1980-81 as compared to the year 1970-71. An increase in general level of development of individual districts and a significant reduction in inter-district disparities during 1980-81 may be attributed to a relatively faster growth in less developed districts (LDDs) resulting from the implementation of various area specific programmes launched in Seventies for ameliorating the socio-economic conditions of the people in different types of backward areas.

2. Sectoral Patterns of Development

Here the study of sectoral patterns of development for different districts would be based upon the analysis of the changes in sectoral compositions of district-wise net domestic product as well as employment in different categories of development during 1980-81 over the base year 1970-71. However, owing to non-availability of data of income originating from tertiary sector, analysis of net domestic product for different districts is restricted to primary and secondary sectors only.

The contributions of these two sectors to net domestic product for the groups of districts falling in different categories of development at two points of time (1970-71 and 1980-81) are given in the followingtable :

Table 4.5 : Sectoral Contributions to Net Domestic Product At Constant Prices of 1970-71

Category of development	Number of Districts	Percentage of Sectoral Contributions			
		1970-71		1980-81	
		Primary	Secondary	Primary	Secondary
1.High (+.74 & above)	12	75.71	24.29	71.82	28.18
2.Medium High (+.46<+.74)	7	87.20	12.80	85.75	14.25
3.Medium Low (-.65 to <+.46)	26	91.72	8.28	90.34	9.66
4.Low Below -.65	11	96.76	3.24	95.33	4.67
U.P.	56	86.82	13.18	83.61	16.39

Source : Derived from the district-wise data given in various issues of District Domestic Net Output, Uttar Pradesh, Economics and Statistics Division, State Planning Institute, Lucknow.

Note : The primary sector comprises agriculture and Animal Husbandry, Forestry and Logging, Fishing, Mining and Quarrying, whereas secondary sector includes registered and unregistered manufacturing units only.

At the state level, we observe that the contribution of primary sector to the total net domestic product for all the 56 districts of Uttar Pradesh reduced from 86.82 per cent in 1970-71 to 83.61 per cent during 1980-81, whereas the corresponding percentage for secondary sector increased from 13.18 per cent to 16.39 during this period. The analysis of inter-sectoral

contributions in respect of different categories of development also confirms that contribution of primary sector generally reduced in each of the categories during 1980-81 as compared to the year 1970-71, effecting simultaneously an increase in contribution of secondary sector. In support of this statement, the district-wise percentages of sectoral contributions to the total net domestic product given in appendix III also exhibit that the contribution of primary sector to net domestic product generally decreased in majority of the districts during 1980-81 over the base year 1970-71, whereas the corresponding contribution of the secondary sector showed a simultaneous increase during this period.

On the other hand, inter-category comparisons reveal that the contribution of primary sector to the total net domestic product in each of the selected years goes on increasing successively from the category of high level of development to downwards, whereas the corresponding contribution of secondary sector goes on decreasing as we move from higher to lower category of development. Moreover, the contribution of secondary sector to net domestic product is found to be the highest in the category of high level of development and the lowest in the category of low level of development. The former portrays a case of diversified structure of economy, whereas the latter places heavy reliance on agriculture. The pattern of development in districts of low level of development is highly imbalanced and their economies suffer from serious sectoral lags. Hence, there does exist a sharp contrast in the sectoral pattern of development between the districts of high and low levels of

development. Besides, there seems to be the direct and positive relationship between the contribution of secondary sector and the level of development. As would be evident from the above table, a higher contribution of the secondary sector to total net domestic product has resulted in the higher level of development and vice versa. Hence, the role of secondary sector appears to be the most crucial in bringing about significant improvements in the pattern of overall development of different districts.

Turning to the aspect of sectoral pattern of employment, we find that the percentage share of workers employed in the agriculture sector to total workers at the state level for all the 56 districts showed a reduction from 76.91 in 1970-71 to 74.71 during 1980-81 as would be evident from the following table :

Table 4.6 : Percentage Share of Workers Employed in Agriculture and Non-Agriculture Sectors To Total Workers

Category of development	Number of Districts	Percentage Share of Workers			
		1970-71		1980-81	
		Agriculture[1]	Non-Agriculture[2]	Agriculture[1]	Non-Agriculture[2]
1.High (+.74 & above)	12	62.15	37.85	56.08	43.92
2.Medium High (+.46 to < +.74)	7	73.09	26.91	72.81	27.19
3.Medium Low (-.65 to < +.46)	26	83.42	16.58	83.16	16.84
4.Low (Below -.65)	11	85.78	14.22	83.29	16.71
U.P.	56	76.91	23.09	74.71	25.29

Note: 1. Workers employed in agriculture include cultivators and agricultural labourers.
2. Workers employed in non-agriculture consist of those engaged in household industry and other workers.

Source: Census of India-1981, Series-22, Uttar Pradesh, Paper 1, Supplement, Provisional Population Totals, Director of Census Operations, Uttar Pradesh, Lucknow.

The percentage share of workers employed in non-agriculture sector correspondingly increased from 23.09 to 25.29 during this period. This inter-sectoral pattern of employment when analysed for the groups of districts falling in different categories of development also provides clear-cut indications regarding the existence of a similar kind of situation. As would be evident from the above table, the percentage share of workers employed in agriculture decreased in different categories of development during 1980-81 as compared to 1970-71, whereas the percentage share of workers employed in non-agriculture sector correspondingly increased in each of the categories of development during this period. The district-wise percentages of sectoral employment to the total workers given in appendix IV also confirm that the percentage share of workers employed in agriculture to total workers decreased in majority of the districts during 1980-81 as compared to the year 1970-71, wheras the corresponding share of non-agriculture sector increased simultaneously during this period.

Moreover, inter-category analysis of sectoral pattern of employment reveals that at both the selected points of time the percentage share of workers employed in agriculture sector to total workers goes on increasing as we move from the category of high level of development to downwards. In juxtaposition, we observe that the percentage share of workers employed in non-agriculture sector goes on reducing successively from the category of high level of development to its lower side. Besides, the above table also exhibits a significant difference in sectoral pattern of employment from one category of development to another. A share of workers employed in non-agriculture

sector is considerably high (i.e., 37.85 per cent in 1970-71 and 43.92 per cent in 1980-81) in the category of high level of development, whereas the corresponding share of workers employed in the same sector is found to be significantly low (i.e., 14.22 per cent in 1970-71 and 16.71 per cent in 1980-81) in the category of low level of development. On the other hand, an opposite trend seems to hold good in respect of workers employed in agriculture sector. The percentage share of workers employed in agriculture is found to be the lowest (62.15 per cent in 1970-71 and 56.08 in 1980-81) in the category of high level of development and the highest (i.e., 85.78 per cent in 1970-71 and 83.29 per cent in 1980-81) in the category of low level of development.

Thus, with the help of the foregoing analysis we recapitulate two interesting observations. First, there was a general decline in the contribution of primary sector to the total net domestic product in almost all the districts of this state during 1980-81 over the bsse year 1970-71, but the degree of its decline was much more pronounced in the districts of 'high' and 'medium high' levels of development than those falling in 'medium low' and 'low' categories of development. Second, the percentage share of workers employed in non-agriculture sector to total workers generally showed an enhancement in majority of the districts during the reference period, however the degree of its enhancement was strongly marked in the districts of 'high' and 'medium high' categories of development as compared to those belonging to 'medium low' and 'low' categories of development. A significant conclusion based on these observations is that the districts of 'high' and 'medium high' level of development have attained relatively more diversified structure of economy

and better sectoral pattern of development leading towards achieving the objective of balanced growth. Whereas the districts occupying their positions in 'medium low' and 'low' categories of development largely depend on agriculture and are still far away from the sectoral balance in development. These differences in sectoral pattern of development between the districts of different categories might be an outcome of the differences in levels of development in key sectors of the economy, i.e., agriculture, industry, economic infrastructure and social services.

In sum, through the foregoing cross-section and inter-temporal analysis of patterns of overall development it seems that the adoption of new strategy of development based on 'area development' and 'target group' approaches during seventies has, inter-alia, proved to be effective in bringing about a general improvement in socio-economic status of different districts, improvement in relative positions of certain districts and significant reduction in inter-district disparities in levels of development. Besides, the composite indices of development for different districts based on the application of First Principal Component Analysis also provides an overall view of development for different districts alongwith a reliable list of relatively less developed districts (LDDs), which might prove to be useful while planning for accelerated balanced regional development. But one of the major drawbacks of these results is that they fail to provide a clear-cut indication for formulation of area specific programmes for sectoral development in less developed districts. In view of its utmost relevance in the present context, a separate analysis pertaining to agriculture, industry, economic infrastructure and social services would, therefore, be attempted in the subsequent chapter.

Chapter V

PATTERNS OF DEVELOPMENT IN AGRICULTURE, INDUSTRY, ECONOMIC INFRASTRUCTURE AND SOCIAL SERVICES

Having analysed the differences in inter-district and inter-sectoral patterns of overall development now we proceed to highlight the disaggregative picture of development for different districts. This is required primarily because of two-fold reasons. First, no doubt, the analysis of composite index of overall development helps us to a large extent in identifying the districts of general backwardness which can be deemed as priority areas for launching special programmes to cope with the problem of inter-district disparities in levels of development and thereby achieve the objective of balanced regional development. But within the districts of general backwardness there are chances of significant variations in levels of development of different sectors. Some of the districts which are developed with respect to agriculture might be adjudged as less developed with respect to industry or the other sectors. Whereas some other districts, which are developed in industrial sector, might be less developed with respect to agriculture, economic infrastructure, etc. The composite index of overall development is not sufficient to reflect those differences in levels of sectoral developments of different districts which are essentially required for preferential treatment and formulation of differential strategy of development and well-tailored area specific programmes. Probably it conceals more than it reveals.

Second, the development of backward areas has been one of the main considerations in our successive five year plans. It was, however, deemed to be the matter of serious concern only in the Third Plan when the policy for balanced regional development was set forth to arrest inter-district disparities. During the Fourth Plan, there was a major break through in the formulation of the policy for backward area development. Different kinds of backward areas following the criteria of physico-geographic characteristics, composition of tribal population and sectoral deficiencies were delineated and special programmes for the development of Drought Prone Areas, Hill Areas, Tribal Areas and Industrially Backward Areas were launched. But the approach adopted for identification of backward areas was 'special purpose' oriented rather than based on the use of a comprehensive list of indicators required for precision in identification of such areas. To fill up this gap, efforts would, therefore, be made in the subsequent sections to analyse the district-wise pattern of development separately for each of the selected key sectors of the economy (i.e. agriculture, industry, economic infrastructure and social services) and spell out the list of less developed districts (LDDs) relating to each of them.

1. Patterns of Agricultural Development

As stated in the previous chapter, though the percentage share of primary sector (i.e., agriculture, forestry and logging, fishing, mining and quarrying) in the total net domestic product slided down at the state level during the previous decade, it still continues to be substantial. During sixties as

well as seventies there had been a significant improvement in the technology of cultivation with spread of high yielding varieties and wider expansion of irrigation. The barriers of outmoded land tenure system, use of primitive technology and lack of infrastructure for raising productivity have been overcome to a considerable extent. In view of these, it would be interesting to analyse the extent to which these structural transformations have brought about changes in inter-district patterns of agricultural development. For this purpose, we have selected nine indicators to represent agricultural development of different districts. Some of these indicators like value of agricultural produce per ha. of net area sown exhibit productivity or performance of agriculture and some others like intensity of cropping show a combined influence of agricultural inputs, whereas the rest like consumption of fertilizer per ha. of cropped area are chiefly responsible for both the production and productivity in agriculture. The correlation matrices of the selected nine indicators of agricultural development separately for the years 1970-71 and 1980-81 are given in the following tables :

Table 5.1

Inter-correlation Matrix:1970-71

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	1.00								
A_2	.47	1.00							
A_3	.55	.85	1.00						
A_4	.53	.42	.33	1.00					
A_5	.53	.31	.31	.36	1.00				
A_6	.67	.31	.55	.35	.77	1.00			
A_7	.47	.34	.35	.29	.45	.65	1.00		
A_8	.45	.44	.45	.32	.51	.68	.62	1.00	
A_9	.39	.48	.64	.32	.45	.47	.30	.37	1.00

Number of observations = 56

Table 5.2

Inter-Correlation Matrix:1980-81

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	1.00								
A_2	.55	1.00							
A_3	.59	.82	1.00						
A_4	.63	.37	.30	1.00					
A_5	.33	.49	.35	.35	1.00				
A_6	.51	.32	.47	.32	.74	1.00			
A_7	.53	.47	.51	.32	.41	.72	1.00		
A_8	.47	.33	.54	.33	.70	.80	.72	1.00	
A_9	.68	.60	.74	.36	.33	.55	.67	.56	1.00

Number of observations = 56

As would be evident from the above tables, all the nine indicators of agricultural development are positively associated with each other in both the years (1970-71 and 1980-81). In respect of 1970-71, we observe that the first principal component explains 69 per cent of the total variation. The equation for the composite index of agricultural development (Z_1) stands as:

$Z_1 = (.8146)A_1 + (.5534)A_2 + (.7781)A_3 + (.4182)A_4 + (.6922)A_5 + (.8862)A_6 + (.6743)A_7 + (.7195)A_8 + (.6399)A_9$ where, A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8 and A_9 indicate values of the selected indicators in the standardized form and figures in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z_1 with each of the selected variables are positive and their estimated values are .81, .55, .78, .42, .69, .89, .67, .72 and .64 respectively. Moreover, in respect of 1980-81, we find that the first principal component explains as much of the total variation as 73 per cent. The equation for its composite index (Z_1) works out as:

$Z_1 = (.7959)A_1 + (.5813)A_2 + (.7959)A_3 + (.4255)A_4 + (.5313)A_5 + (.8224)A_6 + (.7825)A_7 + (.8252)A_8 + (.8410)A_9$ where, A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, and A_9 denote values of the selected variables in the standardised form and figures in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z_1 with each of the selected variables are positive and their values stand as .80, .58, .80, .43, .53, .82, .78, .83 and .84 respectively. The estimates of composite indices of agricultural development for different districts separately for the years 1970-71 and 1980-81

are given in Appendix II. The classification of districts according to composite index of agricultural development into high, medium high, medium low and low categories is depicted in the following table :

Table 5.3

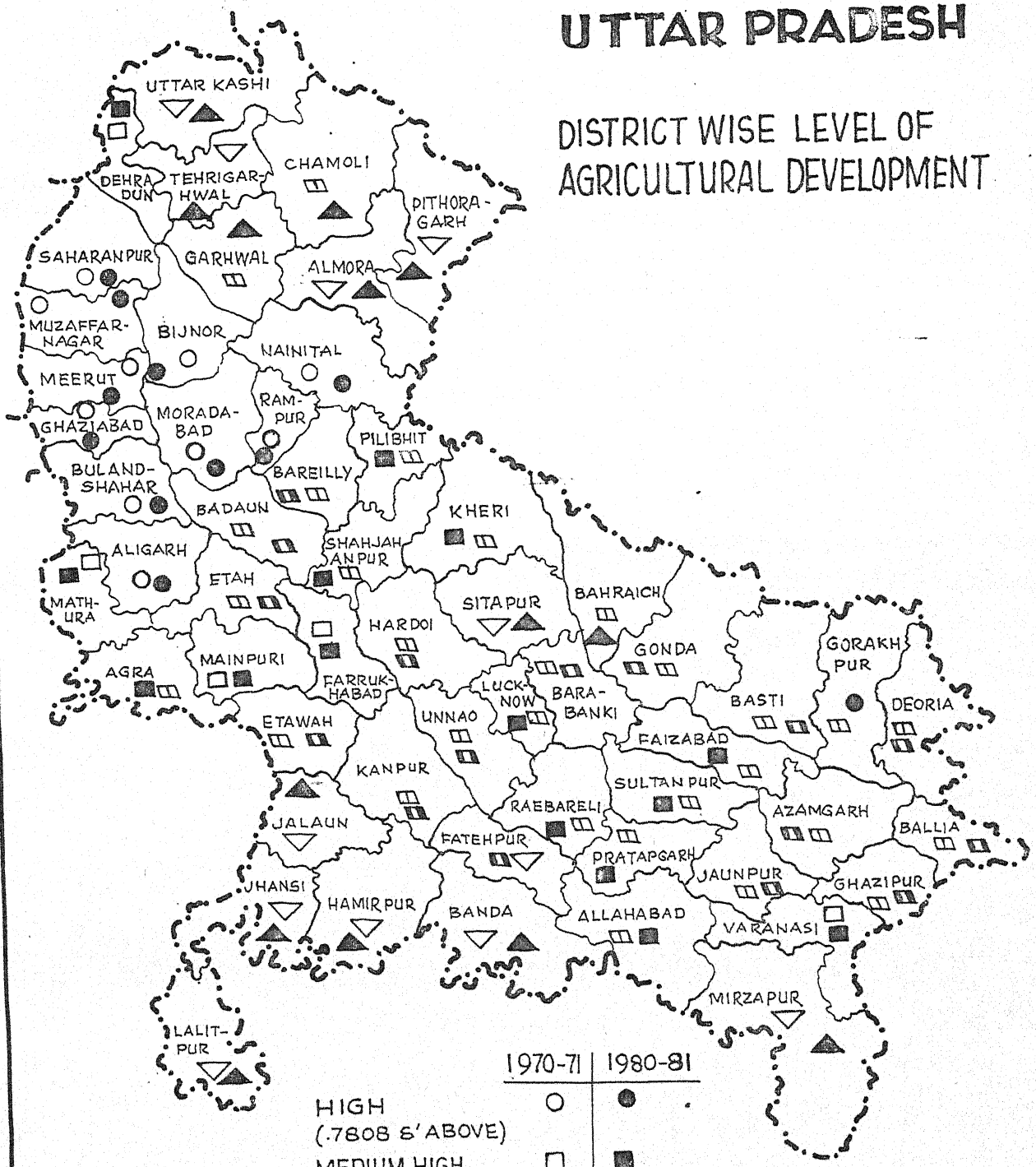
Classification of Districts According to Composite Index of Agricultural Development

Category of development	1970-71	1980-81
1. High (.7808 and above)	Meerut, Ghaziabad, Muzaffarnagar, Nainital, Saharanpur, Bulandshahr, Rampur, Aligarh, Moradabad, Bijnor (10)	Muzaffarnagar, Meerut, Ghaziabad, Nainital, Saharanpur, Bulandshahr, Bijnor, Moradabad, Rampur, Gorakhpur, Aligarh (11)
2. Medium High (.3033 to <.7808)	Mathura, Farrukhabad, Mainpuri, Varanasi, Dehradun (5)	Dehradun, Farrukhabad, Pilibhit, Sultanpur, Varanasi, Agra, Pratapgarh, Allahabad, Rae Bareli, Faizabad, Shahjahanpur, Kheri, Mainpuri, Mathura, Lucknow (15)
3. Medium Low (-.5796 to <.3033)	Barabanki, Allahabad, Deoria, Basti, Pilibhit, Shahjahanpur, Agra, Faizabad, Gorakhpur, Rae Bareli, Etah, Bareilly, Lucknow, Etawah, Badaun, Azamgarh, Jaunpur, Gonda, Ballia, Sultanpur, Kheri, Kanpur, Chamoli, Pratapgarh, Bahraich, Garhwal, Hardoi, Unnao, Ghazipur (29)	Jaunpur, Deoria, Bareilly, Basti, Ghazipur, Etah, Kanpur, Gonda, Etawah, Barabanki, Azamgarh, Badaun, Ballia, Hardoi, Unnao, Fatehpur (16)
4. Low (Below -.5796)	Sitapur, Jalaun, Fatehpur, Mirzapur, Uttarkashi, Lalitpur, Jhansi, Hamirpur, Pithoragarh, Banda, Almora, Tehri Garhwal (12)	Sitapur, Chamoli, Mirzapur, Jalaun, Pithoragarh, Lalitpur, Jhansi, Uttarkashi, Almora, Bahraich, Banda, Hamirpur, Tehri Garhwal, Garhwal (14)

(Above classification is also shown in Map-3)

UTTAR PRADESH

DISTRICT WISE LEVEL OF AGRICULTURAL DEVELOPMENT



MAP-3

The analysis attempted here is essentially two-fold. First, inter-temporal analysis is sought through examining the upward or downward movements of different districts in levels of agricultural development during 1980-81 over the base year 1970-71. Second, a cross-section analysis of inter-district levels of development in agriculture is carried out through inter-category comparisons separately for 1970-71 and 1980-81. Regarding the former, we observe that the number of districts falling in the category of high level of agricultural development increased from 10 in 1970-71 to 11 only during 1980-81. The remaining 45 districts are still found to be underdeveloped or developing in the matter of agricultural development. It is further observed that against the total number of 56 districts, there are, in all, 13 districts which showed inter-category movements in levels of their agricultural development during 1980-81 over the base year 1970-71. These districts belonged to the category of medium low level of agricultural development in 1970-71, but during 1980-81 one of them (Gorakhpur) attained high level of agricultural development, the relative positions of the other two districts (Chamoli and Bahraich) attenuated from medium low to low level of agricultural development and the ten districts showed an upward movement from medium low to medium high. The remaining 43 districts held their positions in their initial categories over the period, although absolute values of composite indices of agricultural development showed an improvement in most of the cases.

As a result of the aforesaid changes, there was an increase in the state level arithmetical mean of composite indices of

agricultural development for all the 56 districts from .0518 in 1970-71 to .1523 during 1980-81 as would be evident from the Appendix II. Moreover, the number of districts having composite indices of agricultural development above the state level mean increased from 21 in 1970-71 to 33 during the year 1980-81. Besides, using coefficient of variation as a measure, we find that inter-district disparities in levels of agricultural development showed a considerable decline from 1724 per cent to 650 per cent during this period.

So far as inter-category comparisons of agricultural development are concerned, it is clear from the above table that in 1970-71 the number of districts falling in the category of medium low and low was as high as 41, whereas those belonging to high and medium high categories were 15 only. But there seems to be some definite improvement in agricultural situation during 1980-81. This is supported by the fact that the number of districts falling in medium low and low categories considerably reduced to 30 and those constituting high and medium high categories of its development simultaneously increased to 26. The improvement in agricultural situation which took place mainly in the districts of medium low level of its development during 1980-81 might be an outcome of better and effective implementation of various area specific programmes formulated for the development of backward areas during seventies.

Thus, three interesting findings noticeable from the foregoing analysis are : (i) an upward movement of certain districts in levels of agricultural development, (ii) an increase in values of its composite indices in sizeable number of districts and (iii)

a significant reduction in inter-district disparities in levels of agricultural development. These findings, in turn, provide us a substantial support to further conclude that there has been some definite improvement in inter-district pattern of agricultural development during 1980-81 as compared to 1970-71.

Finally, it would also be interesting to examine as to what extent the districts falling in the category of high level of agricultural development are showing contrast from those constituting the category of low level of its development. This is attempted here through analysing values of certain selected indicators of agricultural development for top five and bottom five districts which are given in the following table :

Table 5.4

Values of Certain Selected Indicators of Agricultural Development for Top Five and Bottom Five Districts During 1980-81

Districts	Values of Selected Indicators During 1980-81				
	Value of agricultural produce per ha. of net area sown (Rs.)	Consumption of fertilizer per ha. of cropped area (Kg.)	Consumption of power per ha. in agriculture (KWH)	Percentage of net irrigated area to net area sown	Percentage of area under commercial crops to gross cropped area
A. Top 5 Districts					
1. Muzaffarnagar	5886	71.12	273.27	84.18	54.40
2. Meerut	4876	87.98	345.00	89.71	52.80
3. Ghaziabad	3973	78.22	312.13	85.15	35.02
4. Nainital	4293	83.35	48.71	55.91	24.15
5. Saharanpur	4113	64.54	130.70	64.98	42.53
B. Bottom 5 Districts					
1. Bahraich	1480	26.12	25.22	17.63	7.66
2. Banda	1487	6.37	39.00	22.51	2.62
3. Hamirpur	1327	5.28	18.00	18.17	7.97
4. Tehri Garhwal	2137	1.82	2.07	11.97	5.45
5. Garhwal	2304	2.48	3.26	8.63	2.18

As would be evident from the above table, agricultural productivity in terms of value of agricultural produce per ha. of net area sown is found to be much higher in the top five districts as compared to the bottom five ones. This value is exorbitantly high in case of the former with maximum (Rs.5886) in Muzaffarnagar and minimum (Rs.3973) in Ghaziabad, whereas the corresponding figures in case of the latter are extremely low with maximum (Rs.2304) in Garhwal and minimum (Rs.1480) in Bahraich. Generally, value of agricultural produce per ha. of net area sown is influenced by a complex set of factors which could possibly be intensity of cropping, crop diversification and supply of strategic inputs like irrigation, fertilizer, pesticides, seeds, credit and institutional factors including research. But in the present context, differences in adoption of modern technology, which essentially consists of use of agricultural inputs and commercialisation, seem to have played a major role in productivity variations between these two sets of districts.

To be more specific, we observe in the above table that consumption of fertilizer per ha. of gross cropped area in top five districts ranges from 64.54 Kg. in Saharanpur to 87.98 Kg. in Meerut, whereas the corresponding figures in bottom five districts are 1.82 Kg. in Tehri Garhwal and 26.12 Kg. in Bahraich respectively. The use of power per ha. of net area sown is also at much higher pace in top five districts ranging from 48.71 KWH in Nainital to 345.00 KWH in Meerut as compared to the bottom five districts where these lowest and highest limits lie between 2.07 KWH in Tehri Garhwal and 39.00 KWH in Banda district

respectively. Not only this, coverage of irrigation in terms of percentage of net irrigated area to net area sown is also considerably high in top five districts with maximum (89.71%) in Meerut and minimum (55.91%) in Nainital, whereas these figures are extremely low in bottom five districts with maximum (22.51%) in Banda and minimum (8.63%) in Garhwal. Among these components of modern technology, irrigation seems to be the most important explanatory variable obviously because it captures the effect of other agricultural inputs like fertilizer. In sum, a proportionately higher use of fertilizer, power and irrigation in top five districts has resulted in an expansion of area under commercial crops, effecting higher value productivity in agriculture, whereas in cases of bottom five districts, relatively lower use of these agricultural inputs has led to less commercialisation and lower order of agricultural productivity.

2. Patterns of Industrial Development

To cope with the general economic backwardness this is considered desirable to diversify pattern of the economy by equipping it with the latest machinery and making full use of modern techniques of production. Industrialisation is the key to restructuring the economy[1] and hence the role of industrial sector in economic development of different districts seems to be the most crucial. With this end in view, the emphasis on industrialization in India was laid in the beginning of the Third

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[1] Alan B.Mountjoy(Ed), 'Industrialisation in the Third World' : Problems and Prospectives, Machmillan Press, 1978, p. 94.

Plan to combat the challanges of the growing demand for employment resulting from an incessant rising trend of labour force and the bleak chances of absorption of additional labour in agriculture.[2] The measures taken to create conditions of industrial development especially in backward areas comprised mainly the development of infrastructure, development of small scale industries, industrial licensing and location of central sector projects.

The above mentioned measures, no doubt, led to some favourable impact on dispersal of industries, but induced industrialisation could not be achieved in the absence of post natal measures. Therefore, during the Fourth Plan two Working Groups were set up by the Planning Commission - one to identify backward districts[3] and the other to deal with incentives for attracting entrepreneurs to set up industrial units in backward areas.[4] Following the recommendations of these two Groups, quite a large number of promotional and protective measures were taken up by the Central and State governments during seventies. As a result of implementation of these measures two distinct

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[2]Papola, T.S. and Misra, V.N., 'Some Aspects of Rural Industrialisation', Economic and Political Weekly, Vol.XV, No.41 42 and 43, Special Number, Bombay, 1980, p.1733.

[3]Pande, B.D., Identification of Backwardness, 1969, op.cit.

[4]Wanchoo, N.N., Fiscal and Financial Incentives for Starting Industries in Backward Areas, Report of the Working Group, Development Commissioner (Small Scale Industries) Ministry of Industrial Development, Internal Trade and Company Affairs, Government of India, April, 1969.

patterns of industrialisation seem to have emerged on the economic map of Uttar Pradesh. First, agglomerated pattern of industrialisation which is an outcome of concentration of capital intensive large scale manufacturing units in a few districts like Kanpur, Agra, Ghaziabad and Varanasi. The second, dispersed pattern of industrialisation which is relatively less capital intensive and is spread over small towns and rural settlements in different districts. A separate analysis of these two patterns of industrialisation can be carried out simultaneously with the help of two different sets of indicators.[5] But here we have considered a mix of the two (agglomerated and dispersed patterns of industrialisation) for purposes of the present analysis and a sub-vector of seven indicators is chosen to represent the level of industrial development of different districts. Some of these indicators like value added by manufacture per industrial worker tell us regarding the performance of industrial sector, some others focus on variations in concentration of industrial activities in different districts, whereas the rest exhibit inter-district differences in workers' employment and use of power. The correlation matrices of these seven indices of industrial development separately for the years 1970-71 and 1980-81 are given below :

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[5] Amitabh Kundu and Moonis Raza, Indian Economy : The Regional Dimension, New Delhi, 1982, pp.77-108.

Table 5.5

Inter-Correlation Matrix:1970-71

	B_1	B_2	B_3	B_4	B_5	B_6	B_7
B_1	1.00						
B_2	.52	1.00					
B_3	.77	.49	1.00				
B_4	.76	.48	.89	1.00			
B_5	.58	.44	.48	.38	1.00		
B_6	.63	.46	.77	.70	.53	1.00	
B_7	.48	.65	.41	.44	.47	.49	1.00

Number of observations = 56

Table 5.6

Inter-correlation Matrix:1980-81

	B_1	B_2	B_3	B_4	B_5	B_6	B_7
B_1	1.00						
B_2	.55	1.00					
B_3	.77	.52	1.00				
B_4	.58	.66	.73	1.00			
B_5	.69	.69	.39	.39	1.00		
B_6	.72	.55	.73	.59	.42	1.00	
B_7	.35	.59	.49	.49	.49	.40	1.00

Number of observations = 56

The above tables reveal that all the seven indices of industrial development are positively associated with each other in both the years (1970-71 and 1980-81). In respect of 1970-71, we observe that the first principal component explains 65 per cent of the total variation. The equation for the composite index of industrial development (Z_2) stands as:

$$Z_2 = (.9088)B_1 + (.2372)B_2 + (.9319)B_3 + (.8875)B_4 + (.5844)B_5 + (.8292)B_6 + (.2085)B_7.$$ where, B_1, B_2, B_3, B_4,

B_5, B_6 and B_7 indicate values of the selected variables in the standardised form and figures in parentheses are the 'factor loadings' or 'weights'.

The coefficients of correlation of Z_2 with each of the seven variables are positive and their values work out as .91, .24, .93, .89, .58, .83 and .21 respectively. On the other hand, in respect of 1980-81 we find that the first principal component explains as much of the total variation as 74 per cent. The equation for composite index of industrial development (Z_2) works out as :

$Z_2 = (.8939)B_1 + (.3532)B_2 + (.8871)B_3 + (.7996)B_4 + (.6044)$ $B_5 + (.8348)B_6 + (.5945)B_7$. Where, B_1, B_2, B_3, B_4, B_5, B_6 and B_7 indicate values of the selected variables in the standardised form and figures in parentheses are the 'factor loadings' or 'weights'.

The coefficients of correlation of Z_2 with each of the selected indicators are positive and their estimated values are .89, .35, .89, .80, .60, .83 and .59 respectively. The absolute values of composite indices of industrial development for different districts at two points of 1970-71 and 1980-81 are given in Appendix II. The classification of districts according to composite index of industrial development into high, medium high, medium low and low categories separately for 1970-71 and 1980-81 is given in the following table :

Table 5.7

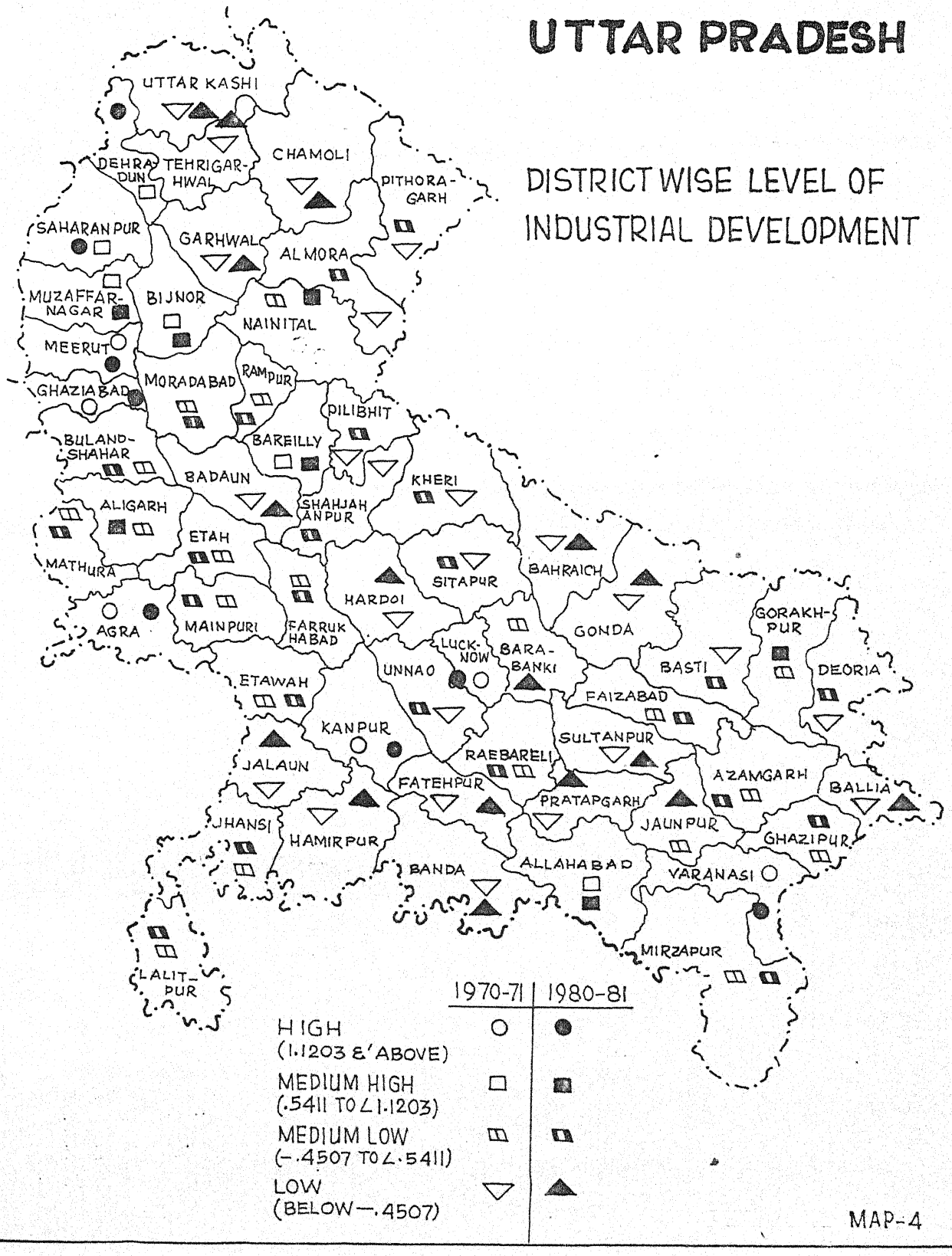
Classification of Districts According to Composite Index of Industrial Development

Category of development	1970-71	1980-81
1. High (1.1203 and above)	Kanpur, Meerut, Ghaziabad, Agra, Lucknow, Varanasi (6)	Ghaziabad, Meerut, Kanpur, Lucknow, Agra, Dehradun, Varanasi, Saharanpur (8)
2. Medium High (.5411 to < 1.1203)	Saharanpur, Dehradun, Muzaffarnagar, Bijnor, Bareilly, Allahabad (6)	Muzaffarnagar, Allahabad, Gorakhpur, Bijnor, Nainital, Bareilly, Aligarh (7)
3. Medium Low (-.4507 to < .5411)	Aligarh, Gorakhpur, Nainital, Mirzapur, Moradabad, Jhansi, Mathura, Bulandshahr, Rae Bareli, Ghazipur, Mainpuri, Rampur, Lalitpur, Azamgarh, Faizabad, Etah, Etawah, Farrukhabad, Jaunpur, Barabanki (20)	Farrukhabad, Jhansi, Mirzapur, Moradabad, Rae Bareli, Faizabad, Kheri, Mainpuri, Mathura, Rampur, Basti, Azamgarh, Bulandshahr, Lalitpur, Sitapur, Ghazipur, Almora, Deoria, Etah, Pilibhit, Pithoragarh, Etawah, Shahjahanpur, Unnao (24)
4. Low (Below -.4507)	Sitapur, Ballia, Shahjahanpur, Deoria, Garhwal, Hamirpur, Pilibhit, Unnao, Sultanpur, Hardoi, Jalaun, Chamoli, Fatehpur, Banda, Pratapgarh, Kheri, Basti, Gonda, Uttar Kashi, Badaun, Tehri Garhwal, Pithoragarh, Almora, Bahraich (24)	Barabanki, Fatehpur, Jaunpur, Ballia, Garhwal, Tehri Garhwal, Chamoli, Gonda, Hamirpur, Uttar Kashi, Bahraich, Banda, Pratapgarh, Hardoi, Sultanpur, Jalaun, Badaun (17)

(Above classification is also shown in Map-4)

UTTAR PRADESH

DISTRICT WISE LEVEL OF INDUSTRIAL DEVELOPMENT



MAP-4

Inter-temporal analysis of the above table reveals that the number of districts falling in the category of high level of industrial development showed a marginal increase from six in 1970-71 to eight during 1980-81 because of an upward movement of Saharanpur and Dehradun districts from medium high to high level of industrial development. The remaining 48 districts, which are still found to be industrially underdeveloped or developing, may be designated as less developed districts (LDDs). Moreover, the total strength of districts in medium high level of industrial development instead of reducing from six to four rose to seven during 1980-81 because of an upward movement of Aligarh, Gorakhpur and Nainital districts to the next higher stage from their original category of medium low. Owing to this reshuffle, the number of districts in medium low was likely to reduce from 20 in 1970-71 to 17 during 1980-81. But because of an upward movement of seven districts (Sitapur, Shahjahanpur, Pilibhit, Kheri, Basti, Pithoragarh and Almora) from low to medium low during this period, the total strength of districts in the latter instead of reducing increased to 24. Thus, it transpires from the foregoing analysis that there was a definite improvement in ranking positions of twelve districts which showed an upward movement from their original categories to the next higher ones during this period. The inter-category movements in cases of the remaining 44 districts did not occur, although absolute values of composite indices of industrial development showed a general rise in most of the cases.

A general improvement in level of industrial development is also discernible from an increase in the state level arithme-

tical mean of its composite indices for all the 56 districts from 0.035484 in 1970-71 to 0.244396 during 1980-81 as would be evident from the Appendix II. Moreover, the number of districts having composite indices of industrial development above the state level mean also increased from 16 in 1970-71 to 24 during 1980-81. Besides, using coefficient of variation as a measure, we find that inter-district disparities in levels of industrial development significantly reduced from 2525 per cent in 1970-71 to 428 per cent during 1980-81.

On the other hand, inter-category comparisons separately for each point of time tell us that the number of districts falling in the categories of medium low and low levels of industrial development in 1970-71 was as high as 44, whereas the corresponding number in cases of high and medium high categories was as low as 12. But because of relatively faster growth in industrially less developed districts, there was some definite improvement in relative positions of certain districts during 1980-81. With the result, the number of districts falling in the categories of high and medium high level of industrial development increased to 15, whereas those belonging to the categories of medium low and low reduced to 41, besides a general increase in composite indices of industrial development in most of the districts. This improvement in industrial situation might be attributed to the favourable impact brought about by implementation of various promotional and protective schemes in industrially backward districts during seventies.

In the above context, it would be interesting to examine as to what extent the pattern of industrial development in

industrially developed districts differs from that of industrially less developed districts. This is attempted through analysing values of certain selected indicators of industrial development for top five and bottom five districts which are shown in the following table :

Table 5.8

Values of Certain Selected Indicators of Industrial Development for Top Five and Bottom Five Districts During 1980-81

Districts	Values of Certain Selected Indicators		
	Value added by manufacture per industrial worker(Rs)	Concentration of all factories per 000 Sq.Km.of area	Percentage of urban population to total population
A. Top 5 Districts			
1.Ghaziabad	15,096	266.92	33.86
2.Meerut	11,421	69.64	31.29
3.Kanpur	12,128	110.75	47.03
4.Lucknow	7,555	143.38	52.48
5.Agra	7,301	140.76	38.93
B. Bottom 5 Districts			
1.Pratapgarh	2,444	1.11	5.07
2.Hardoi	2,556	1.16	11.62
3.Sultanpur	1,065	1.12	3.31
4.Jalaun	1,710	.87	19.89
5.Badaun	1,260	.36	16.18

As would be evident from the above table, industrial productivity in terms of value added by manufacture per industrial worker is found to be much higher in top five districts as compared to bottom five ones. The value added by manufacture per industrial worker is quite high in the former with maximum (Rs.15,096) in Ghaziabad and minimum (Rs.7,301) in Agra, whereas the corresponding figures in the latter are extremely low with maximum (Rs.2,556) in Hardoi and minimum (Rs.1,065) in Sultanpur. These productivity variations are found to be positively associated with two major factors, i.e., concentration of industrial

activities and the degree of urbanisation. Specifically, we observe that concentration of all factories per 000 Sq. Km. of area is quite high in top five districts and ranges from 70 units in Meerut to 267 units in Ghaziabad, whereas the corresponding concentration in bottom five districts is extremely low, ranging from 0.36 unit in Badaun to 1.16 unit in Hardoi. On the other hand, there seems to be the positive relationship between the level of industrial productivity and the degree of urbanization. In this connection, we observe that the top five districts, which have attained higher level of industrial productivity, have also got high degree of urbanisation with maximum (52.48 per cent) in Lucknow and minimum (31.29 per cent) in Meerut. Contrary to this, the degree of urbanisation in cases of bottom five districts, which have relatively lower level of industrial productivity, is considerably low with maximum (19.89%) in Jalaun and minimum (3.31%) in Sultanpur district.

While summing up, we may conclude that an increase in the state level arithmetical mean of composite indices of industrial development, improvement in relative positions of certain districts and reduction in inter-district disparities show some definite improvement in inter-district patterns of industrial development during 1980-81 over the base year 1970-71.

3. Patterns of Development in Economic Infrastructure

Infrastructure plays a catalytic role in the process of development.[6] It is defined as comprising the basic services

[6]Robbins, L., The Theory of Economic Development in the History of Economic Thought, New York, Lecture 2, 1968.

and public utilities essential to the commodity producing sectors of an economy.[7] It is also called a social overhead capital which is generally invested before an economy 'takes off' into sustained growth.[8] A distinction is often made between the economic and social components of infrastructure : the core of economic infrastructure comprises road, transport, communication, supply of power and water and social infrastructure includes education, medical services, financial institutions, etc. All the components of infrastructure are both the cause and effect of economic advancement. Here we are concerned with economic infrastructure which is represented by a sub-vector of 10 indicators relating to mainly road, power, irrigation and banking. The correlation matrices of these indicators separately for the years 1970-71 and 1980-81 are given in the following tables :

Table 5.9

Inter-correlation Matrix:1970-71

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
C_1	1.00									
C_2	.33	1.00								
C_3	.82	.48	1.00							
C_4	.40	.60	.50	1.00						
C_5	.64	.45	.74	.33	1.00					
C_6	.63	.50	.73	.36	.54	1.00				
C_7	.36	.39	.42	.47	.30	.45	1.00			
C_8	.45	.49	.36	.46	.39	.37	.45	1.00		
C_9	.52	.77	.66	.55	.31	.66	.48	.30	1.00	
C_{10}	.45	.68	.60	.49	.34	.68	.42	.33	.77	1.00

Number of observations = 56

[7] Alan B. Mountjoy(ed.), op.cit., p.85.

[8] Jain, O.P. and Savara, S.K., Industrialisation in the Third World, 1980, New Delhi.

Table 5.10

Inter-correlation Matrix:1980-81

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
C_1	1.00									
C_2	.46	1.00								
C_3	.36	.45	1.00							
C_4	.30	.60	.65	1.00						
C_5	.46	.43	.75	.44	1.00					
C_6	.48	.31	.65	.33	.49	1.00				
C_7	.43	.74	.41	.36	.33	.47	1.00			
C_8	.48	.46	.38	.41	.32	.35	.37	1.00		
C_9	.48	.43	.52	.58	.39	.31	.39	.43	1.00	
C_{10}	.45	.40	.72	.59	.60	.57	.47	.47	.37	1.00

Number of observations = 56

It would be evident from the above tables that all the ten indices of economic infrastructure are positively associated with each other in both the years 1970-71 and 1980-81. In respect of 1970-71, we observe that the first principal component explains 69 per cent of the total variation. The equation for composite index of economic infrastructure (Z_3) stands as:

$$Z_3 = (.8044)C_1 + (.6750)C_2 + (.8973)C_3 + (.6463)C_4 + (.6319)C_5 + (.8386)C_6 + (.1060)C_7 + (.3529)C_8 + (.8421)C_9 + (.7976)C_{10}$$

where, C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9, and C_{10} denote values of the selected variables in the standardised form and figures in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z_3 with the selected variables are positive and their values work out as .80, .68, .90, .65, .63, .84, .11, .35, .84 and .80 respectively. On the other hand, in respect of 1980-81, we observe some improvement in the explanatory power of the selected variables and therefore the

first principal component explains as much of the total variation as 71 per cent. The equation for the composite index of economic infrastructure (Z_3) works out as:

$$Z_3 = (.3559)C_1 + (.5359)C_2 + (.9231)C_3 + (.7939)C_4 + (.7586)C_5 + (.6645)C_6 + (.1513)C_7 + (.3022)C_8 + (.6510)C_9 + (.8195)C_{10}.$$

Where C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9 and C_{10} stand for the values of the selected indicators in the standardised form and the figures in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z_3 with the selected variables of economic infrastructure are positive and their values work out as .36, .54, .92, .79 .76 .66, .15, .30, .65 and .82 respectively. The absolute values of the composite indices of economic infrastructure for different districts at two points of time (1970-71 and 1980-81) are given in Appendix II. The classification of districts according to its composite index into high, medium high, medium low and low categories for the selected points of time is shown in the following table.

Table 5.11

Classification of Districts According to Composite Index of Economic Infrastructure

Category of development	1970-71	1980-81
1.High (.7638 and above)	Meerut,Ghaziabad, Muzaffarnagar,Bulandshahr,Bareilly,Rampur, Varanasi,Kanpur,Dehradun,Saharanpur,Agra, Lucknow,Aligarh, Moradabad(14)	Ghaziabad,Meerut,Bulandshahr,Rampur,Muzaffarnagar, Aligarh,Bareilly,Varanasi, Allahabad,Lucknow,Kanpur, Bijnor,Dehradun,Saharanpur, Agra, Moradabad,Gorakhpur, Nainital(18)
2.Medium High (.4370 to < .7638)	Deoria, Gorakhpur, Ballia, Allahabad, Mathura, Azamgarh, Bijnor, Nainital, Faizabad, Rae Bareli, Jaunpur (11)	Rae Bareli, Farrukhabad, Ghazipur, Deoria, Ballia, Faizabad, Pratapgarh, Sultanpur, Etah, Badaun, Gonda, Unnao, Kheri(13)

Contd./-

Table 5.11(Contd.)

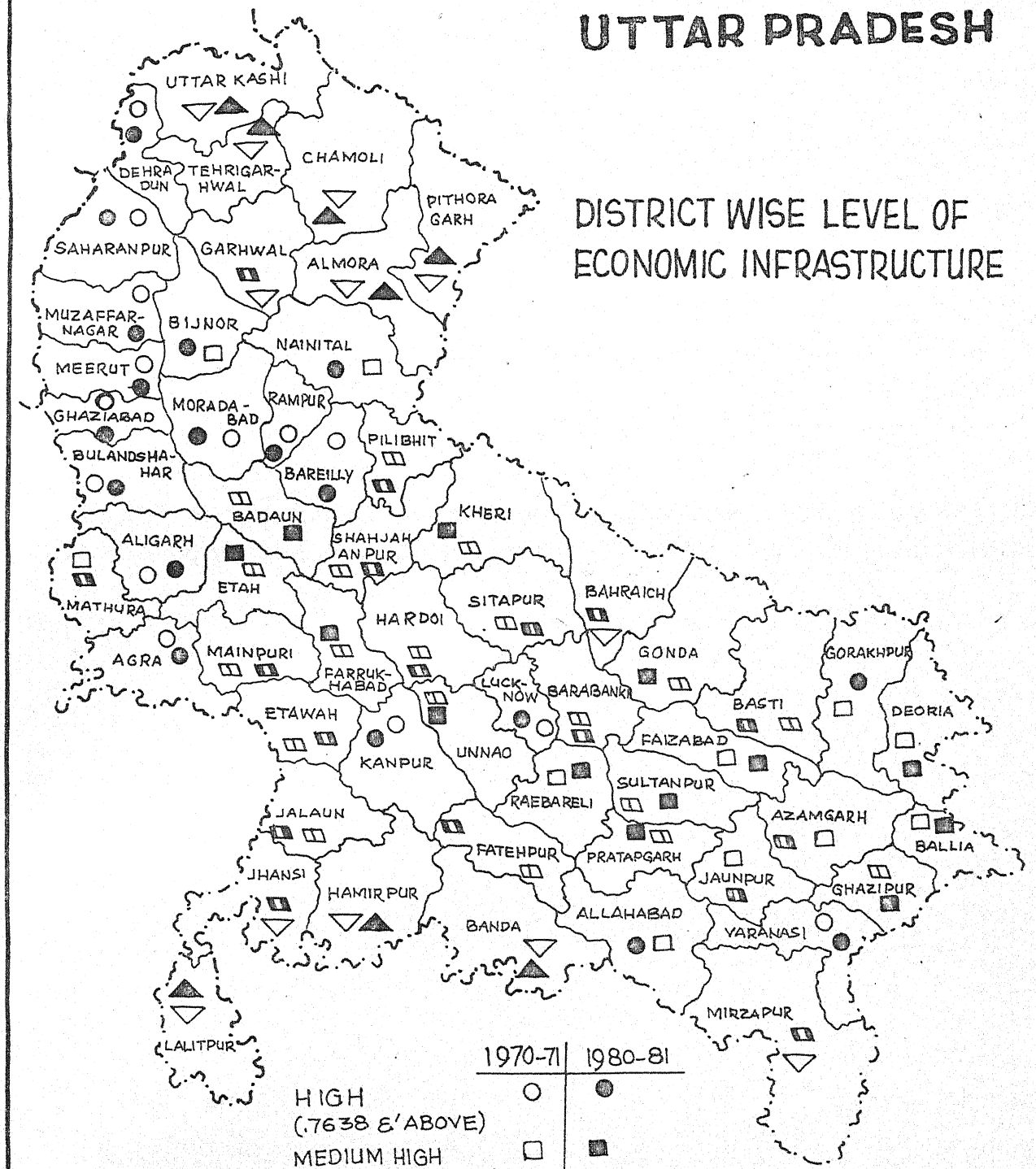
Category of development	1970-71	1980-81
3.Medium Low (-.8673 to <.4370)	Farrukhabad, Pratapgarh, Ghazipur, Sultanpur, Etawah, Etah, Mainpuri, Basti, Barabanki, Pilibhit, Badaun,Unnao, Shahjahanpur, Kheri, Hardoi, Gonda, Fatehpur, Sitapur, Jalaun(19)	Basti, Jaunpur,Mirzapur, Sitapur, Etawah, Mainpuri, Azamgarh, Mathura, Bahraich, Pilibhit, Fatehpur, Hardoi, Sahjahanpur, Barabanki, Garhwal, Jhansi, Jalaun (17)
4.Low (Below -.8673)	Mirzapur, Bahraich, Banda, Jhansi,Lalitpur, Pithoragarh, Hamirpur, Uttar Kashi, Garhwal, Almora, Chamoli, Tehri Garhwal(12)	Hamirpur, Banda, Almora, Lalitpur, Pithoragarh, Tehri Garhwal, Chamoli, Uttar Kashi (8)

(Above classification is also shown in Map-5)

As shown above, there was an increase in number of districts of high level of economic infrastructure from 14 in 1970-71 to 18 during 1980-81 because of an upward movement of Gorakhpur, Allahabad, Nainital and Bijnor districts from its medium high to high category. The remaining 38 districts, which are still found to be underdeveloped or developing, may be designated as less developed districts (LDDs) in economic infrastructure. Moreover, because of upward movements of Farrukhabad, Pratapgarh, Ghazipur, Sultanpur, Badaun, Unnao and Kheri districts from medium low to medium high and downward movement of Azamgarh district from latter to the former during this period, the number of districts in its medium high category increased to 13 during 1980-81. Besides, the number of districts in medium low category during 1980-81 stood at 17 because of an upward movement of Mirzapur, Bahraich, Jhansi and Garhwal districts from low to medium low and downward movement of Azamgarh from medium high to medium low.

UTTAR PRADESH

DISTRICT WISE LEVEL OF ECONOMIC INFRASTRUCTURE



MAP-5

Thus, the changes in inter-district patterns of economic infrastructure over the period are perceptible in cases of 16 districts, out of which 15 showed some definite improvement in their relative positions and the remaining one slided down from medium high to medium low category of economic infrastructure. However, absolute values of composite indices of economic infrastructure showed a general rise in most of the districts during 1980-81 over the base year 1970-71 as would be evident from Appendix II.

A general improvement in level of economic infrastructure is also discernible from the rise in the state level arithmetical mean of composite indices of economic infrastructure for all the 56 districts from .039835 in 1970-71 to .351771 during 1980-81. Beside this, considering coefficient of variation as a measure, we also observe a significant reduction in inter-district disparities in levels of economic infrastructure from 2513 per cent in 1970-71 to 276 per cent during 1980-81. Thus, in respect of economic infrastructure we notice three interesting observations: (i) a general rise in district-wise values of composite indices, (ii) an increase in state level arithmetical mean of composite indices and (iii) a significant reduction in inter-district disparities, which are indicative of some definite improvement in inter-district pattern of economic infrastructure.

On the other hand, a cross-section analysis reveals that in 1970-71 there were, in all, 25 districts which had attained high or medium high level of economic infrastructure, whereas those falling in its medium low and low categories accounted for

31 districts. But we notice some definite improvement in economic infrastructure during seventies. The number of districts constituting first two categories (high and medium high) of economic infrastructure significantly increased to 31 and the number of districts falling in medium low and low categories correspondingly decreased to 25. This is probably because of higher pace of growth of economic infrastructure in less developed districts during this period.

4. Patterns of Development in Social Services

Broadly speaking, social services consist of education, medical services, housing and financial institutions which are generally said to be indirectly conducive to economic development. But the social services as conceived in the present context include education and medical services only and its level of development for different districts is represented by a sub-vector of five indicators. The first three indicators show inter-district variations in levels of educational infrastructure, whereas the latter two exhibit differences in levels of medical infrastructure of different districts. The correlation matrices of all the five indicators of social services separately for 1970-71 and 1980-81 are given in the following tables :

Table 5.12

Inter-Correlation Matrix: 1970-71

	D_1	D_2	D_3	D_4	D_5
D_1	1.00				
D_2	.83	1.00			
D_3	.59	.58	1.00		
D_4	.88	.77	.66	1.00	
D_5	.43	.39	.44	.52	1.00

Number of observations = 56

Table 5.13

Inter-Correlation Matrix: 1980-81

D_1	1.00				
D_2	.95	1.00			
D_3	.82	.78	1.00		
D_4	.91	.88	.86	1.00	
D_5	.57	.51	.51	.54	1.00

Number of observations = 56

As would be evident from the above tables, all the five indices of social services are positively associated with each other in both the years 1970-71 and 1980-81. In respect of 1970-71, we observe that the first principal component explains 68 per cent of the total variation. The equation for composite index of social services (Z_4) stands as :

$$Z_4 = (.8997)D_1 + (.8722)D_2 + (.7932)D_3 + (.9481)D_4 + (.5430)D_5.$$

Where D_1, D_2, D_3, D_4, and D_5 indicate values of the selected variables in the standardised form and figures in parentheses are 'factor loadings' or 'weights'.

The coefficients of correlation of Z_4 with each of the selected variables are positive and as high as .90, .87, .79, .95 and .54 respectively. On the other hand, in respect of 1980-81, we find that explanatory power of the selected variables has gone up and hence the first principal component explains as much of the total variation as 78 per cent. The equation for composite indices of social services (Z_4) works out as :

$$Z_4 = (.9464)D_1 + (.9330)D_2 + (.9139)D_3 + (.9654)D_4 + (.5946)D_5.$$

Where, D_1, D_2, D_3, D_4 and D_5 indicate values of the selected

variables in the standardised form and figures in parentheses are 'factor loadings' or 'weights'.

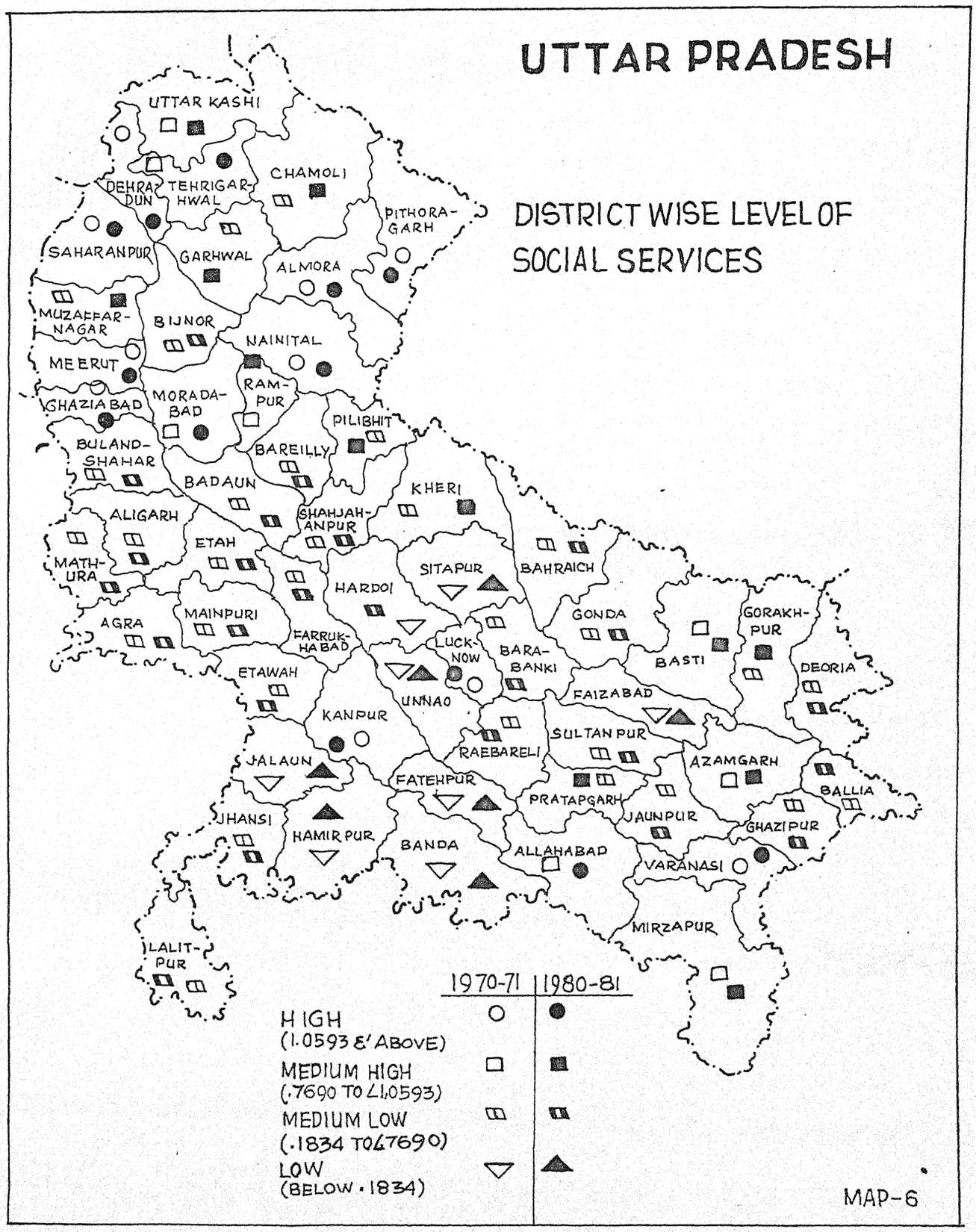
The coefficient of correlation of Z_4 with each of the selected variables are positive and as high as .95, .93, .91, .97 and .59 respectively. The absolute values of the composite indices of social services for different districts at two points of 1970-71 and 1980-81 are given in Appendix II. The classification of districts according to composite indices of social services into high, medium high, medium low and low categories for the selected points of time is given in the following table :

Table 5.14

Classification of Districts According to Composite Index of Social Services

Category of Development	1970-71	1980-81
1. High (1.0593 and above)	Dehradun, Lucknow, Pithoragarh, Nainital, Saharanpur, Ghaziabad, Meerut, Almora, Varanasi, Kanpur (10)	Dehradun, Nainital, Meerut, Ghaziabad, Pithoragarh, Saharanpur, Lucknow, Almora, Varanasi, Allahabad, Moradabad, Tehri Garhwal, Kanpur (13)
2. Medium High (.7690 to < 1.0593)	Tehri Garhwal, Moradabad, Uttar Kashi, Rampur, Allahabad, Mirzapur, Basti, Azamgarh (8)	Pilibhit, Muzaffarnagar, Mirzapur, Gorakhpur, Uttar Kashi, Basti, Garhwal, Chamoli, Kheri, Pratapgarh, Rampur, Azamgarh (12)
3. Medium Low (.1834 to < .7690)	Gorakhpur, Barabanki, Pratapgarh, Garhwal, Bulandshahr, Kheri, Deoria, Muzaffarnagar, Chamoli, Ghazipur, Bijnor, Sultanpur, Bareilly, Etah, Bahraich, Agra, Gonda, Mainpuri, Rae Bareli, Jaunpur, Farrukhabad, Aligarh, Badaun, Ballia, Mathura, Pilibhit, Jhansi, Lalitpur, Shahjahanpur, Etawah (30)	Bulandshahr, Deoria, Hardoi, Ghazipur, Barabanki, Bahraich, Bijnor, Sultanpur, Bareilly, Gonda, Badaun, Agra, Etah, Jaunpur, Rae Bareli, Mainpuri, Farrukhabad, Shahjahanpur, Mathura, Ballia, Aligarh, Etawah, Jhansi, Lalitpur (24)
4. Low (Below .1834)	Hamirpur, Hardoi, Banda, Sitapur, Jalaun, Unnao, Fatehpur, Faizabad (8)	Jalaun, Sitapur, Hamirpur, Banda, Unnao, Fatehpur, Faizabad (7)

(above classification is also shown in Map-6)


UTTAR PRADESH
DISTRICT WISE LEVEL OF SOCIAL SERVICES
UTTAR KASHI
CHAMOLI
DEHRA DUN
TEHRIGARHWAL
PITHORAGARH
SAHARANPUR
GARHWAL
ALMORA
MUZAFFARNAGAR
BIJNOR
NAINITAL
MEERUT
RAMPUR
MORADABAD
GHAZIABAD
PILIBHIT
BULANDSHAHAR
BAREILLY
BADAUN
KHERI
ALIGARH
SHAHJAHANPUR
ETAH
MATHURA
SITAPUR
BAHRAICH
HARDOI
GONDA
GORAKHPUR
AGRA
MAINPURI
FARRUKHABAD
LUCKNOW
BARABANKI
BASTI
DEORIA
ETAWAH
UNNAO
FAIZABAD
KANPUR
SULTANPUR
RAEBARELI
AZAMGARH
JALAUN
FATEHPUR
BALLIA
PRATAPGARH
JHANSI
JAUNPUR
HAMIRPUR
BANDA
GHAZIPUR
ALLAHABAD
VARANASI
MIRZAPUR
LALITPUR
1970-71
1980-81
HIGH
(1.0593 & ABOVE)
MEDIUM HIGH
(.7690 TO 1.0593)
MEDIUM LOW
(.1834 TO .7690)
LOW
(BELOW .1834)
MAP-6

As shown above, the number of districts having high level of social services increased from 10 in 1970-71 to 13 during 1980-81 because of an upward movement of Moradabad, Tehri Garhwal and Allahabad districts from its medium high to high category during this period. The remaining 43 districts are still found to be less developed in social services. As a result of the aforesaid change, the number of districts in medium high level of social services instead of reducing increased to 12 during 1980-81 because of an upward movement of Gorakhpur, Pratapgarh, Garhwal, Kheri, Muzaffarnagar, Chamoli and Pilibhit from the category of medium low to medium high. Besides, the number of districts in the category of low level of social services reduced from 8 to 7 because of an upward movement of Hardoi from low to medium low during this period.

Thus, the foregoing analysis suggests that some definite improvements in social services occurred in cases of 11 districts only, although absolute values of its composite indices showed a general rise in majority of the districts during the period under review. Moreover, an overall improvement in social services is discernible from an increase in the state level arithmetical mean of its composite indices for all the 56 districts from .545960 in 1970-71 to .749202 during 1980-81 as would be evident from the Appendix II. Besides, using coefficient of variation as a measure, we also find that inter-district disparities in levels of social services reduced from 94.20 per cent in 1970-71 to 72.71 per cent during 1980-81.

On the other hand, inter-category comparisons of levels of social services reveal that the number of districts falling in

medium high and high categories in 1970-71 was 13, whereas those constituting medium low and low categories were as high as 38. But an implementation of National Programme of Minimum Needs during seventies seems to have brought about some favourable impact on the development of social services in different districts. With the result, the number of districts falling in high and medium high categories increased to 25 and those constituting low and medium low categories correspondingly reduced to 31 during 1980-81.

Thus, the findings based on both the inter-category comparisons and inter-temporal analysis go in favour of a conclusion that there has been some definite improvement in inter-district patterns of development in social services during 1980-81 over the base year 1970-71.

5. Inter-sectoral Synchronisation

As stated in chapter IV, the coefficients of correlation of composite index of overall development with the selected key sectors of the economy (agriculture, industry, economic infrastructure and social services) are found to be positive and significantly high in both the years 1970-71 and 1980-81. This shows that these sectors undoubtedly play some significant role in the overall development of different districts. But judging from the highest association of economic infrastructure with the overall development, the role of the former seems to be the most crucial not only in overall development but also in sectoral development of agriculture and industry. This loaded statement can further be strengthened by analysing the relationship betweem

the category-wise level of economic infrastructure and the level of overall and sectoral development.

In the above context, it is seen that all the 15 districts, which attained high level of overall development in 1980-81, also had high level of economic infrastructure. The latter seems to be so influencial that out of these developed districts, Meerut, Ghaziabad and Saharanpur occupied high level of development both in agriculture and industry. The next six districts (Nainital, Muzaffarnagar, Bulandshahr, Bijnor, Gorakhpur and Aligarh) attained high level of agricultural development and the other five districts (Kanpur, Lucknow, Dehradun, Varanasi and Agra) held their positions in high level of industrial development. The only exception is Allahabad, which although developed both in economic infrastructure and social services, could not qualify for the status of a developed district. Moreover, majority of the districts, which could find their positions only at the low level of overall development, are also found at the low level of economic infrastructure. These districts were at the low level, not only in overall development but also in agriculture as well as industry. Besides, the existing levels of economic infrastructure of the districts falling in the categories of medium high and medium low levels of overall development, also seem to be fairly commensurate with the development status attained by them in the field of both agriculture and industry. Thus, the foregoing analysis goes in favour of the hypothesis that economic infrastructure plays a predominant role in development.

Alternatively, one can think of the above relationship to be more of associational type rather than causal. But through history of planning in India it is clear that government laid emphashis on development of economic infrastructure in backward areas during the Third Plan to create a minimum quantum of threshold required in terms of social overhead capital which could lead to spontaneous investments in the private sector. Since then a huge amount of investment has been made on development of economic infrastructure like road, power, irrigation and banking institutions. Implementation of these programmes during seventies undoubtedly led to some favourable impact on creation of social overhead capital, which, in turn, helped in promoting development of backward districts. Consequently, the gap between the backward and non-backward districts reduced to some extent.[9] In view of these, the economic infrastructure primarily conceived as one of the preconditions for development seems to have, inter-alia, acted as a causal factor for a speedier process of development.

[9]Tewari, R.T., Opportunity Structure and Industrialisation Backward Areas in U.P.,Working Paper 37, Giri Institute of Development Studies, Lucknow, 1982.

Chapter VI

TOWARDS AMELIORATING LESS DEVELOPED DISTRICTS

The core of the thesis in the present study was to analyse changes in the district-wise pattern of development in Uttar Pradesh during 1980-81 over the base year 1970-71. The underlying proposition behind this thesis was to examine as to what extent the revised strategy of development tuned towards Bottom-up Approach adopted during seventies has gone in favour of bringing about improvement in district-wise pattern of development as against the previous development strategy based on Top-Down Approach, followed in fifties and sixties. One of the prerequisites relating to the fulfilment of this objective was primarily concerned with the measurement of levels of development of different districts. For this purpose, the development as conceived in the present case, was represented by the total vector of 31 indicators drawn from key sectors of the economy, i.e., agriculture, industry, economic infrastructure and social services.

Moreover, the composite indices of overall development and those relating to each of the selected key sectors for different districts at two points of time (i.e. 1970-71 and 1980-81) were worked out by pooling the selected indicators, following the methodology of First Principal Component Analysis. Besides, for purposes of the meaningful analysis, all the 56 districts were divided into High (H), Medium High (MH), Medium Low (ML) and Low (L) categories according to levels of composite index of development. The major findings thus arrived at and already

incorporated in the fourth and fifth chapters of this study are further analysed here to derive some significant conclusions and policy implications which could provide at least some guidelines for transformation of economy with a view to ameliorating the fate of less developed districts.

1. Identification of less Developed Districts (LDDs)

As stated in the fifth chapter, the development of backward areas has been one of the main considerations in our successive five year plans. It was, however, only around seventy when different kinds of backward areas following the criteria of physico-geographic characteristics, compositon of tribal population and sectoral deficiencies were delineated and programmes for the development of spacial problem areas like drought prone, hills, tribals and industrially backward areas were launched.[1] But the approach adopted for identification of these areas was 'special purpose' oriented rather than based on the use of a comprehensive list of indicators required for greater precision in identification. To fill up this gap, the efforts have been made in this study through making use of suitable indicators to spell out the lists of less developed districts (LDDs) from the point of view of backwardness of overall economy and that relating to each of the selected key sectors

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[1]Mathur, O.P., 'National Policy for Backward Area Development : A Structural Analysis', Indian Journal of Regional Science, Vol.VI, Kharagpur, 1974, pp.73-90.

of agriculture, industry, economic infrastructure and social services. Hierarchically, the districts falling in the category of high level of overall development were designated as developed and those constituting medium high, medium low and low categories were put together with nomenclature of less developed districts or backward areas.

As we know, comprehensive programmes for the development of backward districts have never been introduced in any state. The spatial dimension of planning in India and Uttar Pradesh as figure during the past was more of ad hoc and piece meal nature which invariably needs to be replaced by the comprehensive regional planning for accelerated development.[2] The above mentioned lists of less developed districts would help in introducing comprehensive regional planning primarily in two ways. First, at the state level, it would help in making rational distribution of available divisible outlays among the backward and non-backward districts on one hand and determining inter-sectoral priorities for plan formulation on the other. Second, comprehensive planning, which involves an integrated approach aiming at sectoral and spatial balances, can more meaningfully be designed at the district level by taking into account not only the organisational net work and exploitation levels of the existing natural and manpower resources but also the sectoral deficiencies as indicated by the lists of the less developed districts relating to the selected key sectors of the economy.

[2]United Nations, Regional Development Planning, Economic Bulletin for Asia and the Far East, Vol.XXIII, No.3, September 1972, p.1.

2. Inter-Spatial And Inter-Sectoral Patterns of Development

The two major dimensions - inter-spatial and inter-sectoral - were taken into account for analysing the district-wise pattern of development in the state. Regarding the former three interesting observations in respect of overall development during the period 1971-81 are noticeable from the major findings incorporated in the fourth chapter of this study. First, there was some definite improvement in relative positions of certain districts, besides a general rise in composite indices of overall development of individual districts. Second, there was also an increase in number of districts above the state level arithmetical mean of composite indices of development for all the 56 districts. Third, using coefficient of variation as a measure, we also noticed a significant reduction in inter-district disparities in levels of development. These observations are indicative of the fact that during the previous decade there has been some definite improvement in inter-district patterns of overall development which might be attributed to a relatively faster growth in less developed districts resulting from the implementation of area specific programmes launched in seventies for ameliorating the socio-economic conditions of the people in different parts of the state especially in backward areas. These observations are applicable not only in respect of overall development but also the selected key sectors of the economy (i.e., agriculture, industry, economic infrastructure and social services) as major findings of the latter are fairly comparable with those of the former.

Turning to the sectoral dimension of overall development, we observe that contribution of primary sector to total net domestic product in different categories of development showed a general decline during 1980-81 as compared to the year 1970-71, effecting a simultaneous increase in contribution of secondary sector. Moreover, inter-category comparisons reveal that the contribution of primary sector to the total net domestic product in each of the selected years goes on increasing as we move from higher to lower category of development; whereas the corresponding contribution of secondary sector exhibits a declining trend. Besides, the contribution of secondary sector to the total net domestic product is found to be the highest in the category of high level of overall development and the lowest in the category of low level of development, indicating a sharp contrast in the sectoral pattern of development between the districts of high and low levels of overall development. The former portrays a case of more diversified structure of economy, whereas the latter places a heavy reliance on agriculture. The patterns of development in the districts of low level of development are highly imbalanced and their economies suffer from serious sectoral lags.

On the other hand, regarding the sectoral pattern of employment, we find that percentage share of workers employed in agriculture to total workers in different categories of development showed a general decline during 1980-81 as compared to the year 1970-71, whereas the corresponding share of workers employed in non-agricultural sector showed a simultaneous increase during this period. Moreover, inter-category analysis

of sectoral pattern of employment reveals that percentage share of workers employed in agriculture to total workers goes on increasing as we move from high to low category of development, whereas the corresponding share of non-agricultural workers goes on declining successively from high to low category of development. Besides, a share of workers employed in non-agricultural sector is found to be the highest in the category of high level of development and the lowest in the category of low level of development.

Thus, there appears to be a close relationship between the contribution of secondary sector to the total net domestic product and the level of overall development. But simply on the basis of this relationship it would not be desirable to assign overwhelming importance to the secondary sector alone because the other key sectors like agriculture, economic infrastructure and social services are also found to be highly correlated with the level of overall development. Corollary to this, one may further argue that no single sector flourishes, in isolation, obviously because of the predominant role of inter-sectoral dependencies. The problem facing the less developed districts is not one of choosing between primary and secondary sector activities but rather one of ensuring the balanced expansion of all appropriate sectors of the economy.[3] In our case we have seen that the level of overall development happens to be fairly commensurate with levels of development of key sectors of the economy. All the districts falling in the category of high level of overall development have also attained high level of economic infrastructure and high or medium high

[3] United Nations, Process and Problems of Industrialisation in Underdeveloped Countries, 1955, New York, p.3.

levels of development in agriculture and industry, whereas those belonging to the low level of overall development have generally low base of economic infrastructure and low levels of agricultural and industrial development.

Therefore, an overall development of less developed districts (LDDs) imperatively calls for a balanced expansion of the diverse sectors of the economy. This is more relevant in the context of comprehensive planning because if the expansion potential in some critical sector is at a low ebb or absent, the expansion - potential of other sectors cannot become effective.[4] A continuous effort has already been made in this direction to improve upon structure of economies at the district level and overcome the problem of sectoral lags. As a result of this, some achievements in terms of better diversified structure of economy, higher productivity and increased income and employment are quite perceptible in developed districts. But less developed districts still suffer from severe sectoral deficiencies, causing under-development characterised by low income, low productivity, poverty, unemployment, etc. Therefore, certain policy prescriptions regarding the development of agriculture, industry, economic infrastructure and social services are suggested in the subsequent paragraphs to bring about a significant reduction in sectoral deficiencies of less developed districts which, in turn, would facilitate in achieving the objective of balanced regional development.

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[4] A.G.B., Fisher, Economic Progress and Social Security, p.178.

1. Agricultural Development

Development of agriculture in less developed districts requires a special treatment because of three-fold reasons. First, a majority of population in these districts depend upon agriculture and man-land ratio is considerably high. Since there exists underemployment in the midst of underdevelopment in agriculture, its modernisation would be necessary to improve the socio-economic status of the masses. Second, agricultural productivity in these districts is extremely low as compared to its counterparts in the state mainly because of lack of irrigation facilities, less use of modern agricultural inputs and lower degree of commercialisation. Hence in view of the existing inter-district differentials in agricultural productivity there seems to be a wider scope of agricultural development. Third, an overall development invariably involves industrialisation which is said to be contingent upon agriculture in the sense that the latter has to meet the food requirement of the persons engaged in industrial sector.[5] Therefore, for promoting industrialisation in less developed districts, we have to plan for a highly efficient and preferably commercialised agriculture with high productivity of both land and man.

A general policy of our agricultural development should aim at maximising the value of agricultural produce per hectare of net area sown. But considering the existing variations in levels

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[5]Lewis, W.A., The Principles of Economic Planning, p.126.

of agricultural development from one category of districts to another, inter-category differential strategy is suggested for a simultaneous enforcement. A higher level of adoption of irrigation-fertilizer technology and a considerable shift in cropping pattern from low value to high value crops in all the eleven developed districts belonging to the category of high level of agricultural development have already led to an appreciable increase in value productivity, besides fetching sufficient surpluses of foodgrains. However, looking to the experiences of its counterparts in other states like Punjab, Haryana and Karnataka, commercialisation still seems to have a wider scope in these districts. The efforts should, therefore, be intensified in them through providing reasonable price support and proper marketing facilities to bring maximum possible area under high value crops of oilseeds, pulses, sugarcane, etc.

The remaining 45 districts are classed as 'less developed', of which the numbers belonging to medium high, medium low and low categories of agricultural development are, 15, 16 and 14 respectively. Within the less developed districts, we observe wide fluctuations in value productivity, use of modern agricultural inputs and degree of commercialisation. Most of the districts belonging to the medium high level of agricultural development undoubtedly produce surplus of foodgrains but agricultural productivity in both physical and value terms and degree of commercialisation are still quite low as compared to the developed districts. Therefore, augmenting the levels of agricultural productivity and crop diversification should form the core of strategy in these districts.

On the other hand, adoption of irrigation-fertilizer technology and proportion of area under commercial crops are considerably at low pace in the districts constituting medium low and low categories of agricultural development. Consequently, both physical and value productivities in these districts are extremely low and production of foodgrains in many of these districts is insufficient to meet the demand of growing population for it. Therefore, our strategy of agricultural development in these districts should concentrate on fulfilling the twin objectives of maximising production and productivity of foodgrains and bringing larger area under commercial crops. This would require a substantial progress to be made in raising intensity of cropping through adoption of suitable cropping pattern, increased irrigation potential, increased use of fertilizers and pesticides, better crop varieties and quality seeds and higher level of production technology for major cereals, oilseeds, cotton, sugarcane, pulses, etc. Among these components of modern agricultural technology, irrigation should be accorded the highest priority because of its unique qualification of capturing the other agricultural inputs. Creation of irrigation potential and its maximum possible utilisation, thus, becomes of utmost significance in the context of agricultural development. Considering the availability of existing ground water resources, there seems to be a wide scope for developing minor irrigation works through installation of private and community tubewells/pumping sets in almost all the less developed districts located in Eastern/Central and Western regions. However, owing to topographical constraints it would

be appropriate to concentrate on exploitation of surface water resources for creation of additional irrigation potential in Hill and Bundelkhand regions.

A bulk of the farming community constituted by small and marginal farmers are spread through out the state irrespective of backward and non-backward districts. Inadequacy of physical assets and lack of finance were long back identified as the two main bottlenecks in the path of making their farm economics viable and commercial. Therefore, the two major schemes of Small Farmers Development Agency (SFDA) and Marginal Farmers and Agricultural Labourers (MFAL) were started by the Government around the mid of sixties to promote effective participation of these farmers in the process of rural development. As already incorporated in these schemes, with a view to ensuring viability of their farming, agricultural planning of small and marginal farmers was to be integrated with the development of allied activities like animal husbandry, poultry, fisheries, etc. As a result of its implementation, a significant improvement in their farm productivity is well recognised, but allied activities could not be developed to the extent desired for multiplying their activity-mix to make their economy viable. However, development of the latter is found to have shown much encouraging results in the areas which are better served with road, transport and marketing facilities. Therefore, ensuring proper infrastructural and marketing facilities in less developed districts seems to be an important prerequisite for popularisation of mixed farming among the small and marginal farmers at the grass-root level.

2. Industrialisation

Socio-economic improvement of rural poor through reconciliation between growth and equity, and reduction of poverty and unemployment are likely to be the two major policy priorities in India of Eighties. Industrialisation has to play a pivotal role in this gigantic and paramount task firstly by increasing the supply of manufactured goods generally consumed by the rural people and secondary by multiplying income and employment opportunities,[6] besides bringing about the economic transformation and inter-sectoral balances. Uttar Pradesh is one of the industrially backward states of India. A variety of promotional as well as protective measures were taken up in this state during seventies for industrialisation of backward areas.[7] With the result, some definite improvements in inter-district patterns of industrial development are quite perceptible as witnessed by an improvement in ranking positions of the twelve districts, a general rise in composite indices of industrial development of individual districts and a significant reduction in inter-district disparities. But the above mentioned measures have largely gone in favour of developed districts and infrastructural facilities are still found to be deficient in backward ones. In other words, the efforts which were aimed at to be made in the direction of structural transformation through various measures/instruments of strategy and policy seem to have not featured adequately for the purposes of industrialisation in backward districts.[8]

[6]Jain, O.P. and Savara, S.K., op.cit.

[7]Tewari, R.T., Opportunity Structure and Industrialisation of Backward Areas in Uttar Pradesh, op.cit.

[8]Papola, T.S., Economic Constraints on Development, Commerce, Vol.142, No.3649, Bombay, May 23, 1981, p.28.

Consequently, at present there are only eight districts, which according to this study have attained high level of industrial development. The remaining 48 districts are classed as industrially less developed with their further break-ups of 7, 24 and 17 into medium high, medium low and low categories respectively. These districts still lag far behind the industrially developed ones. The percentage contribution of industrial sector to the total net domestic product pooled together for all the 48 less developed districts in 1980-81 at the constant prices of 1970-71 was 18.71 only, whereas the corresponding percentage for the remaining 8 developed districts was as high as 36.72.[9] Lower levels of industrialisation in the former are largely explained by inadequacy of economic infrastructure, less efficacy of protective measures, lack of public sector large scale industries, shortage of entrepreneurs, etc.

Besides planning to overcome the above mentioned bottlenecks, our strategy of industrialisation should primarily aim at improving economic environment for expansion of industrial activities in less developed districts. The economic infrastructure, which plays a significant role in industrial development, has undoubtedly shown some improvements during seventies but is still lacking in almost all the industrially less developed districts. With the result, there could hardly be any appreciable progress in autonomous investment in industrial sector of

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[9] District Domestic Net Output - Uttar Pradesh, 1980-81, Economics and Statistics Division, State Planning Institute, Lucknow.

less developed districts, making the process of diversification slow and vacillating. To overcome the aforesaid problems, it would, therefore, be necessary to carry out pre-industrialisation programme in a comprehensive manner simultaneously in all the industrially less developed districts with a major emphasis on ensuring the availability of a required number of industrial estates, industrial complexes and public sector large scale industries, besides adequacy of infrastructural facilities like roads, power and banking institutions. This would require a huge amount of investment for developing the social overhead capital. And in such case, proceeding with this type of investment until it reaches the minimum quantum of threshold required, would obviously be sensible. Before implementing this programme, it would, however, be necessary to identify the existing infrastructural gaps in each district and chalk out a well-knit action plan for bridging those gaps in future. This would help in implementing the promotional measures in real spirit and preventing the present tendency of allowing flow of benefits of less developed districts to developed ones.

Our past experience reveals that allocation of outlay to industry and mining sector during the period from First to Fifth Plan was only 5 per cent of the total state plan outlay against the corresponding percentage of 24 for India as a whole. Moreover, the central sector investment in this state upto 1977-78 accounted for only 4.2 per cent of the total investment made in the country.[10]

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[10]Government of Uttar Pradesh, Draft Sixth Five Year Plan 1980-85, Review, Department of Planning, Lucknow, Vol.I, p.390.

These allocations for the size of the state like Uttar Pradesh appear to be grossly inadequate when viewed on criteria of population, area, potential and backwardness. The inadequate flow of financial resources to industrial sector might be one of the reasons for slow pace of industrialisation in U.P. in general and less developed districts in particular. Therefore, in any strategy of industrial development, provision of adequate financial resources would essentially be required for successful implementation of pre-industrialisation programme in less developed districts. Once the adequate amount of divisible outlay is earmarked for industrial sector at the state level, its allocation among different districts should be made in accordance with the criteria of population (50 per cent), area (25 per cent) and general backwardness (25 per cent).

A host of the schemes for providing various kinds of concessions and incentives to entrepreneurs started around seventy to attract industries to less developed districts have no doubt, in conjunction with economic infrastructure contributed favourably to industrialisation during seventies as compared to sixties. But some of the studies have shown that even among the less developed districts, these measures have proved to be much more effective in those districts which have relatively better economic infrastructure.[11] This means that protective measures find it difficult to attract industries to remote and unaccessible areas being highly deficient in economic infrastructure. Therefore, within the less developed districts, those

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[11] Papola, T.S. and Tewari, R.T., Impact of Concessional Finance on Industrial Development of Backward Areas : A Study in Uttar Pradesh, Giri Institute of Development Studies, Lucknow, 1981.

districts which have got better infrastructural facilities, should be accorded preference in providing various kinds of concessions and incentives for enhancing their effectiveness. Moreover, capital subsidy which is, at present, confining to few districts only, should be extended to all the industrially less developed districts and the transport subsidy which is applicable to hills alone, should also be extended to other districts which involve high transportation cost in manufacturing and marketing because of being at disadvantageous locations.[12]

The propulsive industries have also to play a significant role in promoting industrialisation of less developed districts through providing raw materials, intermediary goods and skills to non-propulsive industries.[13] It is needless to mention that less developed districts generally suffer from inadequacy of public sector large scale industries especially of propulsive nature. It would, therefore, be imperative to make choice of suitable locations in each of the less developed districts for agglomeration of propulsive industries along with their types

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[12]The backward districts may be at disadvantageous locations because of being remote from domestic transportation routes, remote from industrial growth centres and poor in agricultural and other natural resources. These locational disadvantages ultimately result in high cost or low revenue to entrepreneurs.

[13]According to Francois Perroux, growth is not spread uniformly among various sectors of an economy, but is concentrated in certain sectors and indeed in particular growth industries, which tend to form clusters and dominate other industries having inter-linkages with them. Since these industries generate spread effects to other industries and assist them in raising their income, employment and technology, they are defined as propulsive or growth industries. See A. Kuklinsky (ed.), Polarised Development in Regional Policy and Regional Planning, The Hague, Mouton, 1974.

which are required to be established for ensuring proper linkages with non-propulsive industries and providing maximum possible support to tiny and village industries both existing as well as likely to come up.[14]

Since the propulsive industries cannot function, in isolation, as generators of spread effects to non-propulsive industries, the former must have direct linkages with industrial units congregated at industrial growth centres[15] (called transmission lines). These centres should be potentially strong enough to sustain economic energy to entrepreneurs (called reactors) at the other end. The entrepreneurs should possess adequate capacity to translate the trnsmitted economic energy into a new economic activity by making an appropriate choice for setting up industries in less developed districts.

Thus, industrial growth centres in less developed districts are expected to play the role of transmission lines and entrepreneurs would function as reactors. In the absence of such

[14]Tewari, R.T., 'Strategy Alternatives for Development of Uttar Pradesh', paper presented at the Seminar on Alternative Development Strategies, Giri Institute of Development Studies, Lucknow, February 1981.

[15]The industrial growth centres proposed here differ from those fewer number of selected growth centres recommended by the National Committee on Industrial Development of Backward Areas. The former are proposed to be identified in each of the industrially backward districts following the integrated area development approach, whereas the latter are based on the restrictive definition of backward areas emphasising the need to concentrate at them by the Central and State government agencies for dispersal of industries. There is a feeling that suggestion of the committee does not accord with the political compulsions to meet the claims of different regions in most of the states besides reducing the number of industrially backward districts which are, at present, enjoying the benefits of various kinds of concessions and incentives. See Economic and Political Weekly, Vol.XIV, No.41, Bombay, October 10, 1981, p.1630.

transmission lines, propulsive industries might not be able to generate a quantum of spread effects required for the development of non-propulsive industries. Hence, identification of industrial growth centres would become sine-qua-non. Subsequently, existing infrastructural gaps of identified centres will have to be bridged in order to develop them as potentially strong industrial growth centres. The types of industries to be located at these centes should be both resource base and demand base including footloose industries not oriented to any specific location. There is a wide scope for development of agro-based and livestock based industries at these centes because of easy availability of required raw materials.[16]

3. Development of Economic Infrastructure

A majority of the less developed districts suffering from the overall backwardness are generally found to be at the low level of economic infrastructure, whereas those occupying their positions in the category of high level of overall development are found to be posted with the high level of economic infrastructure. Based on a closer association between the two, the role of economic infrastructure in development appears to be the most crucial and its inadequacy in less developed districts seems to be one of the factors chiefly responsible for low levels of both agricultural and industrial development. Therefore, development of economic infrastructure in less developed

[16]Singh, A.K., Patterns of Regional Development : A Comparative Study, 1981, New Delhi.

districts is deemed to be imperatively a precondition for accelerated balanced development.[17] According to one of the major findings of this study, there are, in all,18 districts which have, already, attained high level of development in economic infrastructure and the remaining 38 districts are classed as less developed. A further break-up of the latter into medium high, medium low and low categories stands as 13, 17 and 8 respectively.

With a view to promoting modernisation of agriculture and industrialisation in less developed districts it would be imperative to undertake a well designed programme for developing economic infrastructure on priority basis. Among the mix of several indicators of economic infrastructure, irrigation (number of tubewells/pumping sets per 000 hectares of net area sown), road (percentage of villages situated within the radius of 3 kms.), power (percentage of villages electrified to total number of villages) and banking (number of bank offices per lakh of population) are considered to be the major components for providing better links to hitherto inaccessible areas and ensuring availability of modern agricultural inputs and basic amenities to villagers. But within the less developed districts, we observe that values of these indicators differ from one

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[17] Tewari, R.T., 'Inter-Regional Disparities in Levels of Development : Indian Experience', paper presented at the Seminar on Development and Inter-Regional Disparities, Giri Institute of Development Studies, Lucknow, 1983.

district to another. All the less developed districts can be divided into two categories in respect of each of these indicators. The first category would consist of those districts which have values of a particular indicator below the state level mean, whereas those constituting the second category would have the corresponding values of the same indicator above the state level mean.

With a view to bridging the existing infrastructural gaps in less developed districts of the above mentioned two categories, it is suggested that a programme for development of economic infrastructure should be carried out in two phases. In the first phase, we should intensify our efforts to upgrade values of the above mentioned indicators to bring the districts of the first category at par with the state level. Simultaneously, in cases of those constituting the second category we should concentrate our efforts to enhance values of the selected indicators to the extent required for bringing them at par with the developed districts. In the second phase, the districts, which are proposed to be provided with infrastructural facilities at par with the state level in the first phase should be taken up for developing economic infrastructure in order to bring them at par with the developed districts.

4. Development of Social Services

The social services are positively associated with the level of overall development and the former's contribution to the latter cannot be undermined. As stated in the previous chapter, an increase in number of districts falling in high and

medium high levels of social services and a significant reduction in its inter-district disparities clearly indicate that an implementation of the National Programme of Minimum Needs during seventies has brought about some favourable impact on the development of social services in different districts during the previous decade. But we observe that there are only 13 districts which could attain high level of development in social services upto 1980-81 and the remaining 43 districts are still found to be less developed in this regard. The latter when divided into medium high, medium low and low categories stand as 12, 24 and 7 respectively.

The lopsided development in social services suggests that probably the norms prescribed under the National Programme of Minimum Needs for providing education and health services in different districts were not strictly adhered to in actual practice. An effective implementation of this programme would, therefore, require a more vigorous and coordinated action to determine realistic physical targets and make rational distribution of financial resources among the less developed districts for achieving the set objective. In this connection, with the help of the prescribed norms it would be necessary to identify first of all, the gaps in education and health services for each of the less developed districts. These gaps would obviously be much larger in the districts having low level of social services as compared to those belonging to medium high and medium low categories. With a view to reducing inter-district differentials in social services it would then be necessary to make allocations of financial resources to less developed

districts in proportion to the size of the existing gaps. Thus, the districts having larger gaps in social services should receive higher financial allocations as compared to those experiencing gaps of the lower order. With these physical targets and financial allocations the district authorities should be asked to provide education and helath services at appropriate locations within a stipulated period of time.

Appendix-I

List of Selected Indicators of Development

Sector	Selected Indicators
I. Agriculture	
A_1	Gross value of agricultural produce per ha. of net area sown(Rs.).
A_2	Gross value of agricultural produce per cppita of rural population (Rs.).
A_3	Gross value of agricultural produce per agricultural worker (Rs.)
A_4	Intensity of cropping (Percentage).
A_5	Percentage of area under commercial crops to gross cropped area.
A_6	Percentage of area under high yielding varieties to gross cropped area.
A_7	Consumption of fertilizer per ha. of gross cropped area (kg.)
A_8	Consumption of power per ha. in agriculture (Kwh.).
A_9	Percentage of net irrigated area to net area sown.
II. Industry	
B_1	Percentage contribution of industrial sector to total net domestic product.
B_2	Value added by manufacture per industrial worker(Rs.)
B_3	Value of industrial output per kwh. consumption of electricity (Rs.)
B_4	Concentration of all factories per 000 sq. km. of area (number).
B_5	Workers engaged in industrial sector per sq.km. of area (number).
B_6	Percentage of household industrial workers to total workers.
B_7	Percentage of other workers to total workers.

III. Economic Infrastructure

C_1	Length of pucca roads per 000, sq.km. of area(Km.).
C_2	Length of pucca roads per lakh of population (Km.).
C_3	Percentage of villages situated within 3 Kms. from pucca roads.
C_4	Percentage of villages situated within 3 Kms. from railway station.
C_5	Percentage of villages situated within 3 kms. from bus stop.
C_6	Percentage of villages electrified to total villages.
C_7	Number of bank offices per lakh of population.
C_8	Number of veterinary hospitals per lakh of livestock population.
C_9	Number of fertilizer-cum-seed stores per 000, sq.km. of area.
C_{10}	Number of tubewells/pumpsets per 000, ha. of net area sown.

IV. Social Services

D_1	Number of Junior Basic Schools per lakh of population.
D_2	Number of Senior Basic Schools per lakh of population.
D_3	Number of Higher Secondary Schools per lakh of population.
D_4	Number of hospitals/dispensaries (Allopathic) per lakh of population.
D_5	Number of hospital beds per lakh of population.

Appendix II-A

District-Wise Values of Composite Indices And Their Class Symbols-1970-71

Economic Regions/Districts	Values of Composite Indices of Development of					Class Symbols of Values of Indices				
	Overall Economy Z	Agriculture Z1	Industry Z2	Economic Infrastructure Z3	Sccial Services Z4	Z	Z1	Z2	Z3	Z4
0	1	2	3	4	5	6	7	8	9	10
I. Western Region										
1. Agra	0.7762	0.2051	2.0309	0.8301	0.4530	H	ML	H	H	ML
2. Aligarh	0.8230	0.9381	0.5185	0.7782	0.3221	H	H	ML	H	ML
3. Badaun	-0.0899	-0.0631	-0.6555	-0.0442	0.3219	ML	ML	L	ML	ML
4. Bareilly	0.6834	0.1044	0.5960	1.1024	0.5133	MH	ML	MH	H	ML
5. Bijnor	1.0103	0.7808	0.5981	0.5519	0.5229	H	H	MH	MH	ML
6. Bulandshahr	1.0706	1.3234	0.0112	1.3196	0.6897	H	H	ML	H	ML
7. Etah	0.1524	0.1131	-0.3689	0.1219	0.4661	ML	ML	ML	ML	ML
8. Etawah	0.2718	0.0263	-0.3712	0.1704	0.1834	ML	ML	ML	ML	ML
9. Farrukhabad	0.4678	0.5954	-0.3819	0.3356	0.3494	MH	MH	ML	ML	ML
10. Mainpuri	0.1609	0.4636	-0.2201	0.0556	0.3537	ML	MH	ML	ML	ML
11. Mathura	0.3800	0.6636	0.0177	0.5660	0.2942	ML	MH	ML	MH	ML
12. Meerut	2.4415	2.4175	2.7658	2.0511	1.2328	H	H	H	H	H
13. Ghaziabad	2.4072	2.4175	2.6390	2.0511	1.2328	H	H	H	H	H
14. Moradabad	0.5504	0.7928	0.3446	0.7638	0.8556	MH	H	ML	H	MH
15. Muzaffarnagar	1.7597	2.3969	0.7147	1.4707	0.6597	H	H	MH	H	ML
16. Pilibhit	0.2299	0.2110	-0.5339	-0.0013	0.2477	ML	ML	L	ML	ML
17. Rampur	0.6765	1.0465	-0.2457	1.0565	0.8419	MH	H	ML	H	MH
18. Saharanpur	1.1925	1.4841	0.8774	0.9518	1.3161	H	H	MH	H	H
19. Shahjahanpur	0.0021	0.2056	-0.5067	-0.1478	0.2331	ML	ML	L	ML	ML
II. Central Region										
1. Barabanki	0.2988	0.2530	-0.4507	0.0100	0.7298	ML	ML	ML	ML	ML
2. Fatehpur	-0.5926	-0.7054	-0.5657	-0.4506	-0.4603	ML	L	L	ML	L
3. Hardoi	-0.3049	-0.5496	-0.5452	-0.4016	-0.2497	ML	ML	L	ML	L
4. Kanpur	1.0735	-0.3860	2.8780	0.9644	1.0593	H	ML	H	H	H
5. Kheri	0.2449	-0.3162	-0.5982	-0.3301	0.6776	ML	ML	L	ML	ML
6. Lucknow	0.9473	0.0576	1.6640	0.7926	1.4106	H	ML	H	H	H
7. Raebareli	0.3743	0.1236	-0.0498	0.4918	0.3528	ML	ML	ML	MH	ML
8. Sitapur	-0.5806	-0.6207	-0.4737	-0.7867	-0.2697	ML	L	L	ML	L
9. Unnao	-0.2897	-0.5741	-0.5380	-0.0773	-0.4256	ML	ML	L	ML	L

Contd./-

Appendix II-A
Continued

0	1	2	3	4	5	6	7	8	9	10
III. Eastern Region										
1. Allahabad	0.6901	0.2507	0.5411	0.5780	0.8255	MH	ML	MH	MH	MH
2. Azamgarh	0.3167	-0.0642	-0.2704	0.5657	0.7690	ML	ML	ML	MH	MH
3. Bahraich	-0.9488	-0.5324	-0.7515	-1.0345	0.4621	L	ML	L	L	ML
4. Ballia	0.2403	-0.2043	-0.4995	0.5931	0.3196	ML	ML	L	MH	ML
5. Basti	0.0827	0.2144	-0.6029	0.0276	0.7875	ML	ML	L	ML	MH
6. Deoria	-0.2449	0.2130	-0.5140	0.7050	0.6690	ML	ML	L	MH	ML
7. Faizabad	0.3200	0.2016	-0.3159	0.5058	-0.7252	ML	ML	ML	MH	L
8. Ghazipur	0.3277	-0.5796	-0.1196	0.2285	0.5329	ML	ML	ML	ML	ML
9. Gonda	-0.1972	-0.1613	-0.6115	-0.4355	0.4430	ML	ML	L	ML	ML
10. Gorakhpur	0.6888	0.2013	0.4342	0.5944	0.7566	MH	ML	ML	MH	ML
11. Jaunpur	0.3484	-0.0990	-0.4223	0.4370	0.3508	ML	ML	ML	MH	ML
12. Mirzapur	-0.5941	-0.7093	0.3756	-0.9532	0.7904	ML	L	ML	L	MH
13. Pratapgarh	-0.0281	-0.4140	-0.5874	0.3266	0.7199	ML	ML	L	ML	ML
14. Sultanpur	-0.0462	-0.2497	-0.5432	0.2075	0.5137	ML	ML	L	ML	ML
15. Varanasi	1.0345	0.3762	1.1203	1.0234	1.1271	H	MH	H	H	H
IV. Bundelkhand										
1. Banda	-1.1011	-1.1606	-0.5734	-1.1595	-0.2682	L	L	L	L	L
2. Hamirpur	-1.1779	-1.1360	-0.5243	-1.4905	-0.2335	L	L	L	L	L
3. Jalaun	-0.9272	-0.6688	-0.5452	-0.8673	-0.3308	L	L	L	ML	L
4. Jhansi	-0.6521	-1.1116	-0.1723	-1.2411	0.2409	ML	L	ML	L	ML
5. Lalitpur	-1.0634	-1.1115	-0.2497	-1.2411	0.2409	L	L	ML	L	ML
V. Hill Region										
1. Almora	-1.3000	-1.2443	-0.7113	-1.8407	1.2121	L	L	L	L	H
2. Pithoragarh	-2.1955	-1.1493	-0.7083	-1.4396	1.3597	L	L	L	L	H
3. Dehradun	0.7489	0.3033	0.7846	0.9556	1.6702	H	MH	MH	H	H
4. Garhwal	-1.7397	-0.5476	-0.5183	-1.8398	0.7178	L	ML	L	L	ML
5. Chamoli	-1.7518	-0.3882	-0.5599	-2.0164	0.6148	L	ML	L	L	ML
6. Nainital	0.6161	1.6592	0.3795	0.5167	1.3252	MH	H	ML	MH	H
7. T.Garhwal	-2.1458	-1.2940	-0.6893	-2.0673	0.9184	L	L	L	L	MH
8. Uttarkashi	-1.9265	-1.0944	-0.6233	-1.6035	0.8504	L	L	L	L	MH

Appendix II-A
Continued

0	1	2	3	4	5	6	7	3	9	10
State Level										
1. Mean	0.053414	0.051810	0.035434	0.039835	0.545960					
2. Standard Deviation	1.016676	0.893105	0.895941	1.000985	0.514293					
2. Co-efficient of Variation	1903.388	1723.7990	2524.9450	2512.8130	94.1997					

Note : Symbols H, MH, ML and L stand for High, Medium High, Medium Low and Low Categories of development respectively.

Appendix II-B

District-Wise Values of Composite Indices And Their Class Symbols-1980-81

Economic Regions/Districts	Values of Composite Indices of Development of					Class Symbols of Values of Indices				
	Overall Economy Z	Agriculture Z1	Industry Z2	Economic Infrastructure Z3	Social Services Z4	Z	Z1	Z2	Z3	Z4
0	1	2	3	4	5	6	7	8	9	10
I. Western Region										
1. Agra	0.8114	0.4506	1.8375	0.8391	0.5643	H	MH	H	H	ML
2. Aligarh	0.7439	0.7902	0.6571	1.3393	0.4285	H	H	MH	H	ML
3. Badaun	0.2754	0.0400	-1.0069	0.4982	0.5904	ML	ML	L	MH	ML
4. Bareilly	0.6555	0.2311	0.6986	1.3269	0.5949	MH	ML	MH	H	ML
5. Bijnor	1.0697	1.3204	0.7854	0.9141	0.6250	H	H	MH	H	ML
6. Bulandshahr	1.3422	1.4858	0.1833	1.8932	0.7217	H	H	ML	H	ML
7. Etah	0.1542	0.1925	-0.3225	0.4994	0.5346	ML	ML	ML	MH	ML
8. Etawah	0.4512	0.1117	-0.3826	0.3714	0.3762	ML	ML	ML	ML	ML
9. Farrukhabad	0.6262	0.6599	0.5299	0.7253	0.4908	MH	MH	ML	MH	ML
10. Mainpuri	0.1813	0.3260	0.2952	0.3607	0.4926	ML	MH	ML	ML	ML
11. Mathura	0.3960	0.3157	0.2873	0.3107	0.4670	ML	MH	ML	ML	ML
12. Meerut	2.4685	2.7298	3.2255	2.5569	1.7880	H	H	H	H	H
13. Ghaziabad	2.4249	1.9835	3.5262	2.6705	1.7314	H	H	H	H	H
14. Moradabad	0.7278	0.9578	0.4831	0.8184	1.2623	MH	H	ML	H	H
15. Muzaffarnagar	1.8252	2.7982	0.8784	1.3560	0.9810	H	H	MH	H	MH
16. Pilibhit	0.2260	0.5358	-0.3496	0.1952	0.9895	ML	MH	ML	ML	MH
17. Rampur	0.6483	0.9564	0.2341	1.3632	0.8194	MH	H	ML	H	MH
18. Saharanpur	1.2183	1.6000	1.3712	0.8712	1.5525	H	H	H	H	H
19. Shahjahanpur	0.1275	0.3478	-0.3917	0.0449	0.4839	ML	MH	ML	ML	ML
II. Central Region										
1. Barabanki	0.3661	0.1070	-0.4602	0.0188	0.6461	ML	ML	L	ML	ML
2. Fatehpur	0.2775	-0.5661	-0.4737	0.1202	-0.3498	ML	ML	L	ML	L
3. Hardoi	-0.4836	-0.4374	-0.8823	0.0893	0.6627	ML	ML	L	ML	ML
4. Kanpur	1.3236	0.1869	2.9019	0.9452	1.1152	H	ML	H	H	H
5. Kheri	0.7075	0.3420	0.4373	0.4626	0.8548	MH	MH	ML	MH	MH
6. Lucknow	1.2395	0.3127	1.9851	0.9641	1.5019	H	MH	H	H	H
7. Raebareli	0.4311	0.3802	0.4450	0.7393	0.5046	ML	MH	ML	MH	ML
8. Sitapur	-0.4639	-0.6667	0.0648	0.3728	0.0557	ML	L	ML	ML	L
9. Unnao	-0.3680	-0.4696	-0.4385	0.4640	-0.3327	ML	ML	ML	MH	L

Contd./-

Appendix II-B
Continued

0	1	2	3	4	5	6	7	8	9	10
III.Eastern Region										
1.Allahabad	0.7974	0.3954	0.8755	1.0800	1.3334	H	MH	MH	H	H
2.Azamgarh	0.3388	0.0985	0.2018	0.3560	0.8144	ML	ML	ML	ML	MH
3.Bahraich	-0.6411	-1.2890	-0.8187	0.1955	0.6311	ML	L	L	ML	ML
4.Ballia	0.2758	-0.1049	-0.5751	0.5887	0.4349	ML	ML	L	MH	ML
5.Basti	-0.3340	0.2289	0.2034	0.4139	0.8894	ML	ML	ML	ML	MH
6.Deoria	0.2910	0.2569	-0.2310	0.6142	0.7113	ML	ML	ML	MH	ML
7.Faizabad	0.3982	0.3651	0.4395	0.5581	-0.4726	ML	MH	ML	MH	L
8.Ghazipur	0.2906	0.2187	0.0049	0.6707	0.6566	ML	ML	ML	MH	ML
9.Gonda	-0.5158	0.1443	-0.6822	0.4910	0.5947	ML	ML	L	MH	ML
10.Gorakhpur	0.7467	0.7933	0.8571	0.7927	0.9503	H	H	MH	H	MH
11.Jaunpur	0.3926	0.2759	-0.5151	0.3953	0.5259	ML	MH	L	ML	ML
12.Mirzapur	0.6365	-0.7990	0.4915	0.3737	0.9664	MH	L	ML	ML	MH
13.Pratapgarh	-0.0281	0.4466	-0.3691	0.5413	0.8456	ML	MH	L	MH	MH
14.Sultanpur	-0.1099	0.4769	-0.3898	0.5406	0.5975	ML	MH	L	MH	ML
15.Varanasi	1.0891	0.4514	1.7247	1.1311	1.3350	H	MH	H	H	H
IV.Bundelkhand										
1.Banda	-1.0786	-1.4240	-0.8598	-1.1089	-0.2776	L	L	L	L	L
2.Hamirpur	-1.1313	-1.4910	-0.7256	-1.0442	-0.0487	L	L	L	L	L
3.Jalaun	-0.8637	-0.8093	-0.9128	-0.7925	0.1409	L	L	L	ML	L
4.Jhansi	0.6271	-1.1317	0.5098	-0.7281	0.2854	MH	L	ML	ML	ML
5.Lalitpur	-1.0332	-1.0617	0.0870	-1.4349	0.2577	L	L	ML	L	ML
V. Hill Region										
1.Almora	-1.4670	-1.1485	-0.2061	-1.1960	1.4439	L	L	ML	L	H
2.Pithoragarh	-1.6391	-0.9081	-0.3564	-1.4469	1.5896	L	L	ML	L	H
3.Dehradun	1.2076	0.7097	1.7862	0.8758	1.8874	H	MH	H	H	H
4.Garhwal	-2.0958	-1.5770	-0.5863	-0.7104	0.8642	L	L	L	ML	MH
5.Chamoli	-1.8446	-0.7592	-0.6747	-1.6627	0.8555	L	L	L	L	MH
6.Nainital	1.0381	1.8272	0.7572	0.7864	1.8510	H	H	MH	H	H
7.T.Garhwal	-1.8911	-1.5363	-0.6637	-1.5604	1.1511	L	L	L	L	H
8.Uttarkashi	-2.5830	-1.1421	-0.8049	-2.1511	0.9227	L	L	L	L	MH

Contd./-

Appendix II-B
Continued

0	1	2	3	4	5	6	7	8	9	10
State Level										
1.Mean	0.183500	0.152321	0.244396	0.351771	0.749202					
2.Standard Deviation	1.039863	0.990708	1.044847	0.969735	0.544750					
3.Co-efficient of Variation	566.6569	650.4087	427.5224	275.6066	72.7107					

Note : Symbols H, MH, ML and L stand for High, Medium High, Medium Low and Low categories of development respectively.

Appendix III

District-Wise Percentage Contribution of Primary and Secondary Sectors to Total Net Domestic Product at Constant Prices of 1970-71

Development Category/ Districts	Percentage Contribution 1970-71		1980-81	
	Primary Sector	Secondary Sector	Primary Sector	Secondary Sector
I. High				
1. Meerut	64.48	35.52	74.94	25.06
2. Ghaziabad			53.59	46.41
3. Muzaffarnagar	86.58	13.42	90.10	9.90
4. Saharanpur	80.44	19.56	68.22	31.78
5. Kanpur	62.72	37.28	63.62	36.38
6. Bulandshahr	90.29	9.71	87.07	12.93
7. Varanasi	60.24	39.76	59.42	40.58
8. Bijnor	85.88	14.12	85.43	14.57
9. Lucknow	61.68	38.32	51.48	48.52
10. Aligarh	88.85	11.15	82.31	17.69
11. Agra	76.65	23.35	73.24	26.76
12. Dehradun	97.25	2.75	68.88	31.12
Total	75.71	24.29	71.82	28.18
II. Medium High				
13. Allahabad	81.55	18.45	71.94	28.06
14. Gorakhpur	89.62	10.38	88.24	11.76
15. Bareilly	75.31	24.69	78.30	21.70
16. Rampur	91.71	8.29	91.75	8.25
17. Nainital	91.25	8.75	92.10	7.90
18. Moradabad	89.86	10.14	91.72	8.28
19. Farrukhabad	94.08	5.92	94.39	5.61
Total	87.20	12.80	85.75	14.25
III. Medium Low				
20. Mathura	93.38	6.62	87.00	13.00
21. Raebareli	95.18	4.82	80.84	19.16
22. Jaunpur	93.87	6.13	95.64	4.36
23. Ghazipur	90.37	9.63	88.53	11.47
24. Faizabad	90.09	9.91	88.71	11.29
25. Azamgarh	92.57	7.43	83.85	16.15
26. Barabanki	88.86	11.14	87.44	12.56
27. Etawah	95.39	4.61	91.24	8.76
28. Kheri	93.37	6.63	95.39	4.61
29. Ballia	93.37	6.63	95.94	4.06
30. Pilibhit	93.88	6.12	94.65	5.35
31. Mainpuri	88.64	11.36	84.39	15.61
32. Etah	90.04	9.96	91.73	8.27
33. Basti	93.44	6.56	94.38	5.62
34. Shahjahanpur	96.06	3.94	96.23	3.77
35. Pratapgarh	95.22	4.78	85.71	14.29
36. Sultanpur	91.62	8.38	95.72	4.28

Contd. /-

Appendix III
Continued

0	1	2	3	4
37.Badaun	97.68	2.32	97.06	2.94
38.Gonda	94.43	5.57	96.29	3.71
39.Deoria	91.21	8.79	92.18	7.82
40.Unnao	96.08	3.92	87.51	12.49
41.Hardoi	93.74	6.26	97.41	2.59
42.Sitapur	90.28	9.72	91.43	8.57
43.Fatehpur	95.36	4.64	94.09	5.91
44.Mirzapur	67.32	32.68	76.45	23.55
45.Jhansi	85.11	14.89	71.19	28.81
Total	91.72	8.28	90.34	9.66
IV.Low				
46.Jalaun	97.74	2.26	97.16	2.84
47.Bahraich	97.89	2.11	97.61	2.39
48.Lalitpur	85.09	14.91	91.36	8.64
49.Banda	94.94	5.06	95.11	4.89
50.Hamirpur	96.39	3.61	91.17	8.83
51.Garhwal	97.59	2.41	97.23	2.77
52.Chamoli			95.83	4.17
53.Almora*	97.68	2.32	95.25	4.75
54.Uttarkashi	99.03	0.97	96.16	3.84
55.Tehri Garhwal			97.54	2.46
56.Pithoragarh*			95.42	4.58
Total	96.76	3.24	95.33	4.67
Grand Total : U.P.	86.82	13.18	83.61	16.39

*Achievements of Pithoragarh in 1970-71 are included in the figures shown against Almora district.

Source : District Domestic Net Output - Uttar Pradesh. Economics And Statistics Division, State Planning Institute, Lucknow, 1983.

Appendix IV

District-Wise Percentage Shares in Total Workers of Those Employed in Agriculture And Non-Agriculture Sectors

Development Category/ Districts	Percentage Shares in Total Workers			
	1970-71		1980-81	
	Agriculture Sector	Non-Agriculture Sector	Agriculture Sector	Non-agriculture Sector
0	1	2	3	4
I.High				
1.Meerut	60.05	31.95	55.98	44.02
2.Ghaziabad			45.72	54.28
3.Muzaffarnagar	71.20	28.80	70.02	29.98
4.Saharanpur	62.84	37.16	63.39	36.61
5.Kanpur	50.96	49.04	50.05	49.95
6.Bulandshahr	71.95	28.05	70.42	29.58
7.Varanasi	58.40	41.60	52.29	47.71
8.Bijnor	92.68	7.32	65.95	34.05
9.Lucknow	46.37	53.63	45.60	54.40
10.Aligarh	67.98	32.02	64.77	35.23
11.Agra	52.15	47.85	49.71	50.29
12.Dehradun	36.57	63.43	37.02	62.98
Total	62.15	37.85	56.08	43.92
II.Medium High				
13.Allahabad	62.38	37.62	70.40	29.60
14.Gorakhpur	81.41	18.59	79.08	20.92
15.Bareilly	73.42	26.58	70.70	29.30
16.Rampur	76.83	23.17	74.81	25.19
17.Nainital	64.00	36.00	63.78	36.22
18.Moradabad	72.79	27.21	69.68	30.32
19.Farrukhabad	80.37	19.63	77.35	22.65
Total	73.09	26.91	72.81	27.19
III.Medium Low				
20.Mathura	68.78	31.22	68.43	31.57
21.Raebareli	87.89	12.11	84.95	15.05
22.Jaunpur	83.56	16.44	79.46	20.54
23.Ghazipur	82.04	17.96	79.24	20.76
24.Faizabad	83.24	16.76	81.20	18.80
25.Azamgarh	70.18	29.82	79.18	20.82
26.Barabanki	86.16	13.84	84.76	15.24
27.Etawah	81.06	18.94	79.45	20.55
28.Kheri	88.60	11.40	87.45	12.55
29.Ballia	82.38	17.62	80.07	19.93
30.Pilibhit	81.83	18.17	80.76	19.24
31.Mainpuri	81.88	18.12	81.73	18.27
32.Etah	82.27	17.73	82.11	17.89
33.Basti	90.77	9.23	87.74	12.26
34.Shahjahanpur	82.86	17.14	80.91	19.09

Contd./-

Appendix IV
Continued

0	1	2	3	4
35.Pratapgarh	87.59	12.41	84.49	15.51
36.Sultanpur	88.12	11.88	86.73	13.27
37.Badaun	88.20	11.80	86.45	13.55
38.Gonda	79.76	20.24	89.32	10.68
39.Deoria	89.26	10.74	83.94	16.06
40.Unnao	86.51	13.49	84.61	15.39
41.Hardoi	88.26	11.74	87.33	12.67
42.Sitapur	80.23	19.77	80.83	19.17
43.Fatehpur	86.31	13.69	84.04	15.96
44.Mirzapur	79.74	20.26	71.74	28.26
45.Jhansi	65.42	34.58	61.03	38.97
Total	83.42	16.58	83.16	16.84
IV.Low				
46.Jalaun	81.06	18.94	79.14	20.86
47.Bahraich	90.96	9.04	89.66	10.34
48.Lalitpur	82.26	17.74	79.38	20.62
49.Banda	87.41	12.59	86.01	13.99
50.Hamirpur	84.81	15.19	81.79	18.21
51.Garhwal	79.31	20.69	76.80	23.20
52.Chamoli	86.96	13.04	81.14	18.86
53.Almora	82.50	17.50	77.01	22.99
54.Uttarkashi	86.90	13.10	80.23	19.77
55.Tehri Garhwal	91.51	8.49	84.91	15.09
56.Pithoragarh	83.00	17.00	83.02	16.98
Total	85.78	14.22	83.29	16.71
Grand Total : U.P.	76.91	23.09	74.71	25.29

Source : Census of India - 1981, Series-22, Uttar Pradesh, Paper-I, Supplement, Provisional Population Totals, Director of Census Operations, Uttar Pradesh, Lucknow.

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